JUN 8 1912

TELEPHONE ENGINEER

Vol. VII CHICAGO, JUNE, 1912 No. 6

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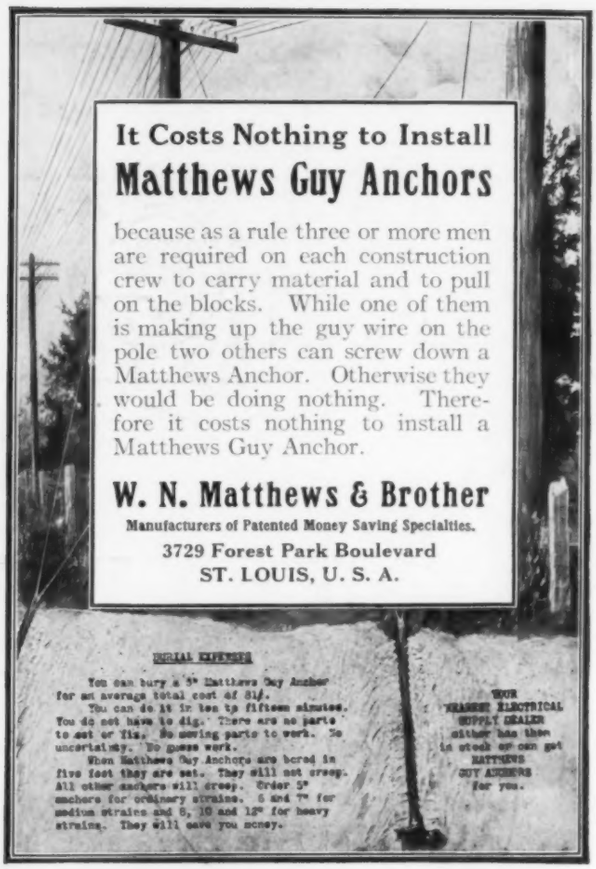

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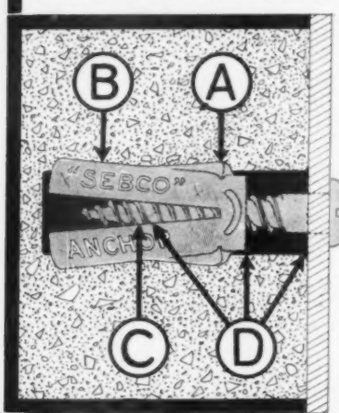

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Telephone Engineer

WITH WHICH IS CONSOLIDATED THE WESTERN TELEPHONE JOURNAL
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CHICAGO, JUNE 1912.

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LAST CALL FOR THE CONTEST.

OUR prize contest for the popularizing of long distance telephony closes July 1. By the way the manuscripts are coming in, the problem of the "dread of long distance" will be solved by that time. But there is still a month for those who have ideas on the subject to work them into material form and give them a chance at first, second, third or fourth prize.

The January and March numbers of TELEPHONE ENGINEER gave, on the editorial pages, the causes behind this contest and explained the condition it is desired to correct. To recapitulate briefly it is this:

Most people dread to use the long distance telephone. This is not the fault of the service, for all toll line companies do everything possible to help the telephone user get his call through to the right party. The feeling of dread is purely psychological. The only cure for it is practice, and the only way to make people practice long distance calling—that is, to make them regard it as an ordinary, every-day procedure—is to convince them that it is easy, certain and convenient. The right kind of a brief essay or article, given proper publicity through telephone directories, circular letters and newspapers, will induce them to *try* long distance; for remember that there are thousands of telephone subscribers who have never talked over a toll line, but resort invariably to the less efficient telegraph or mail for their long distance communications.

Long distance telephoning, or rather the mental attitude toward it, is a matter of habit. To inculcate a habit one must make a start, and the purpose of the prize articles is to induce people to make that start.

So the prize winning essays must do more than catalogue the virtues and advantages of long distance telephony. They must contain that germ of *conviction* that will impress the reader with the truth of their precepts; interest him, move him to resolve that his next long distance message will be via telephone. The man (or woman) clever enough to write a prize winner needs no further instruction. Rules of the contest will be found in the advertising section.

OHIO RATE DECISION REVERSED.

LAST month's issue of TELEPHONE ENGINEER quoted the decision of Judge Duncan of the Common Pleas Court in the case of the Tiffin (Ohio) Art Metal Company *vs.* the Tiffin Consolidated Telephone Compnay. The Tiffin council had passed an ordinance giving the city council the power to adjust telephone rates. The Tiffin Art Metal Company immediately refused to continue to pay the old rate, and the telephone company threatened to remove its telephones. Suit was brought to restrain the telephone company from this action, and the injunction was sustained by

the court. Upon appeal, however, this decision was reversed by the Circuit Court, and it is held that the city council has no power to fix telephone rates.

THE GAIN IN RAILWAY TELEPHONES.

WITH the 1911 report of the Interstate Commerce Commission before us, we are in a position not only to read off directly the gain in telephone miles made in 1911 by the railroads of the United States, but also, by a little calculation, to find wherein that gain lay and whether it was a normal or abnormal growth. For this purpose it is necessary to compare the current report with that of a year ago, which was published in TELEPHONE ENGINEER for May, 1911.

The total net gain in railway telephone miles in this report over the previous one is 6,867. The gain shown in 1910 over the report of 1909 was 11,768 miles. This larger gain for 1910, however, was due to the facts that the report showed electric interstate roads for the first time, and that many of the big steam roads made their first telephone installations during that year. The proportion of telephone mileage to total mileage in 1909 was 20 per cent; in 1910, 19½ per cent, and in 1911, 26 per cent, so that last year really shows the most substantial returns of all.

The largest single gain in telephone mileage shown by the report (as of January 1, 1912), was made by the Atchison, Topeka and Santa Fe, which jumped from 3,884 to 5,947—a gain of 2,063. There are no close seconds, although a number of roads added upwards of 500 miles of telephone circuit during the year. Among these are the Chesapeake and Ohio, a jump of 895 from 69 to 964; the Chicago and Northwestern and subsidiaries from 743 to 1,464 (721); the Chicago, Burlington and Quincy from 2,383 to 2,946 (563); the Chicago, Milwaukee and Puget Sound from 726 to 1,948 (1,222); the Chicago, Rock Island and Pacific from 2,248 to 2,977 (729); the Delaware, Lackawanna and Western from 0 to 974; the Louisville and Nashville from 498 to 1,229 (731); the Missouri, Kansas and Texas from 66 to 759 (693); the Cleveland, Cincinnati, Chicago and St. Louis from 704 to 1,348 (644); the Northern Pacific from 1,190 to 1,817 (627); the Seaboard Air Line from 421 to 1,132 (711); and the Lake Shore and Michigan Southern nearly made it by increasing from 770 to 1,241 (471).

There are a host of railways which show telephone mileage gain for the year of a hundred miles or over. Some of these were not previously reported by the commission, as the Arizona and New Mexico, 108; the Central Vermont, 149; the Chicago, Terre Haute and Southeastern, 155; the Detroit and Mackinac, 150, and the Queen and Crescent, 158.

Of the big roads, the only perfect score is made by the Chicago, Milwaukee and Puget Sound, which operates its entire system (1,948 miles), by telephone, with telegraphic reserve. The D., L. & W. does very well for a newcomer with 974 miles out of 985; and a number of other roads go over the ninety per cent marks. Of the big roads which, at the time of this compilation, had not adopted the telephone, the Central of Georgia; Chicago, St. Paul, Minneapolis and Omaha; Colorado and Southern; Delaware and Hudson; Grand Trunk; Yazoo and Mississippi Valley; International and Great Northern; Kansas City Southern; Maine Central; Minneapolis and St. Louis; Missouri Pacific; Nashville Chattanooga and St. Louis; Vandalia; San Pedro, Los Angeles and Salt Lake; and Wabash. Many of these roads, however, have since indicated their interest in the telephone, and the 1912 report will tell a different story about them.

Altogether there were 165,699 railway miles still to be telephoned at the first of the year. Probably several thousand miles will be equipped this year; but that will leave over 150,000 for coming years. And ultimately that 150,000 miles, as well as the additional mileage of natural railroad growth, will all be equipped with telephones. There is no doubt about that. The new use for the telephone has opened the biggest field it has ever had outside of direct public service.

RATES IN CITIES OF 15,000.

FORT DODGE, Iowa, is in the throes of a rate-raising campaign conducted by the Fort Dodge Telephone Company. Fort Dodge has a population of about 15,500, with 3,341 telephones on a magneto exchange. The size of the community and its system is near enough to the average for the country to be of broad interest.

Manager Joseph M. Plaister of the company is pursuing an unusual course to win support for higher rates. He is appealing directly to the public by taking a subscribers' vote on the subject. At the same time he is striving to secure the indorsement of the city council; for the company's franchise, limiting its rates to the present schedule, has twelve years still to run.

The Fort Dodge case illustrates Iowa's need of a commission capable of analyzing telephone rate questions. In his extremity Manager Plaister had to appeal to the Wisconsin commission for statistics to support his claim that present rates are unprofitable. The reply of the Wisconsin body shows that the Fort Dodge plant has been operated with unusual economy. The average proportion of revenue used for operating expenses in plants of this size is 83.33 per cent. The Fort Dodge company's operating expense last year was 62.19 per cent, in spite of its low rates. The object of the rate increase desired, therefore, is to improve the service to a condition commensurate with the size and importance of the community.

Acting upon the imperative demand for this better service, the Fort Dodge Commercial Club appointed a committee of three to investigate telephonic conditions. The committee conferred with the company and made a report favoring the increase. Some features of this report are given below:

It is generally accepted that the telephone business is unique to the extent, that, as an exchange increases in size, and the number of patrons multiplies, the cost to the company for operation per telephone increases. This is due to the fact that the patron is paying for service, rather than for the rent of an instrument, and as the number of patrons increases the use for the instruments is increased in much greater proportion.

According to our information the company has been paying its stockholders seven per cent annually, that amount of income being as small as they should be asked to accept on an investment which has its full share of risk. It is little more than the ordinary rate of interest upon secured loans.

The item of depreciation is extra large in the telephone business, largely due to the rapid revolution in methods due to the development of a comparatively new science. Although the system now used by the Fort Dodge Telephone Company was as good as any when installed, it is admittedly obsolete now, and should be discarded. Several thousand dollars have been accumulated to the credit of the depreciation account during the life time of the company, but on account of the press-

ing demand for construction work, in order to properly serve the city, this sum of money has been used for extensions. If the depreciation account credit had been put to this use, more capital would have had to be invested by the stockholders and consequently that much more of the income should rightfully have been absorbed by the seven per cent dividend.

The local company asserts it will not ask for an increase in rates which would be in excess of the average rates quoted; and at the same time it points out that while the average number of subscribers in the cities mentioned is 2,050, Fort Dodge has 3,300. According to this estimate, the Fort Dodge patron would have access to more than fifty per cent more telephones than the patron would in the average of those cities.

It cannot be expected that any other corporation would undertake to enter this field on a lower basis than that which the Fort Dodge Telephone Company has demonstrated is necessary for fair profits. It is not right or fair to ask the company now in the field to continue to do business at a loss. That should not be asked of any concern, especially a company composed of fellow citizens who have always shown a desire to work in harmony with the best interests of the city, in this and other things.

But, even if we are not influenced by any sentiment of this kind, we must face the fact that the courts have ruled that compulsory service charges which lose money for a corporation constitute confiscation. If the local company should be forced at any time to prove its allegations in court, it would not be compelled to continue to operate under rates which would not allow it a fair margin of profit.

We believe it would be preferable to have this matter of revision of rates amicably adjusted between the telephone company and the public, rather than to have it forced upon us by an indefinte continuance of poor service, or by proceedings in the courts.

It is taken for granted that in a matter as important as the one under discussion the members of the city council desire to learn what the sentiment of the city is, in order that in acting in their responsible capacity, they may feel they are representing the prevailing feeling.

In the absence of any definite basis of rate making, the obvious recourse is to compare the schedule with those of similar communities that have satisfactory rates. This Mr. Plaister has done; and the result of his compilation appears in the following table of figures taken from representative Iowa cities:

Town	No. of telephones	single line business	2-party business	single line residence	2-party residence
Fort Dodge— (Magneto)	3,341	$2.50	$2.00	$1.50	$1.00
*Sioux City— (Com. Bat.)	6,000	4.00	2.50	2.00	1.50
Waterloo— (Com. Bat.)	4,400	3.00	none	2.00	1.50
*Ottumwa— (Com. Bat.)	2,850	3.00	2.50	1.50	1.25
*Clinton— (Automatic)	2,200	3.00	2.75	2.00	1.50
Boone— (Com. Bat.)	2,075	3.00	2.50	1.50	1.25
Oskaloosa— (Com. Bat.)	2,000	2.50	none	1.75	1.50
Marshalltown— (Com. Bat.)	2,475	2.75	none	2.50	1.75
Mason City— (Com Bat.)	2,000	3.00	2.25	2.00	1.50

From this table the company has worked out an average scale of rates as follows:

Single line, business	$2.75
Two-party, business	2.50
Single line, residence	1.75
Two-party, residence	1.50

The adoption of this schedule as it stands, except for the addition of a four-party residence rate of $1.25, would mean an added gross revenue of $11,000 to the company. It will be noted that although the Fort Dodge plant is larger than the average of those given, it is the only magneto exchange listed. On present rates it is impossible for the company to install common battery equipment.

*Competitive point; independent figures given.

The scale of rates suggested by the company differs somewhat from the average worked out as shown above. The reason for this is that to meet the average figures every class of service must be raised. This would in a measure depopularize telephone service among the masses of people and would correspondingly reduce the value of the telephone to the business men because of the reduction in the number of subscribers that would probably occur. It would be more advantageous for the merchant (who gets by far the largest amount of telephone service) to bear the largest part of a raise in rates that would make the income of the company adequate to its needs. Therefore the company has prepared a third scale of rates which leaves the popular rate of one dollar per month for residence service on the four party line and yet approximates very closely the same total revenue indicated by the average scale of rates.

The suggested schedule is as follows:

Single line, business, $2.75; discount, 25 cents if paid at the office by the 15th of the month.

Two-party line, business, $2.75; discount, 25 cents if paid at the office by the 15th of the month.

Single line, residence, $2.25; discount, 25 cents if paid at the office by the 15th of the month.

Two-party, residence, $1.75; discount, 25 cents if paid at the office by the 15th of the month.

Four-party, residence, $1.25; discount, 25 cents if paid at the office by the 15th of the month.

The Fort Dodge Telephone Company unquestionably deserves its raise. Doubtless it will get it. If Iowa had a telephone commission there would be no question about it. The condition there is but another example of underestimating the demand for service, and a forced growth without a corresponding increase in revenue. It has little value as an object lesson, because the day of new company promotion on inadequate rates is happily over; but it affords, with the statistics it has brought to light, material for the consideration of all companies of similar size, which may be (and many of them are) in similar positions.

GAINING GOOD WILL.

There is probably not existent today an intelligent public utility management that does not realize the dividend-paying possibilities of public good will, says the *St. Louis Electric Magazine*. The problem has not been to decide whether or not the good will of the public was needed, this being a recognized fact, but rather to hit upon the most speedy and efficacious method of securing a consummation so highly desirable.

Investigation proved conclusively that to gain good will and hold it something more was necessary on the part of the utility than simply good service. The public must be given not only the fact itself, but, along with it, information as to how and why the good service was made possible. Of course, the absolute essential is, first, that through a competent executive, a well-organized, intelligent and trained force, an efficient plant, and modern facilities, this superior service be actually given. Following closely in importance to this necessary condition, however, is a campaign of information regarding the methods and inside workings of the utility which will result in better understanding and closer relationship betwen the public and the public-service company.

The utility must have the sincere desire to cultivate the interest and good will of the people by taking them

into its confidence and making them better acquainted with its business affairs.

A properly minded utility executive knows that public sentiment is the most powerful influence in the utility's relations with the community. He wants the help of that influence in his efforts to improve and enlarge the system under his control and to better its service. Having confidence in the sincerity of his aims, he knows that he can gain the desired good will by interesting the people in his work, plans and problems.

A great public utility assuredly is a leading element in the growth and prosperity of any city and an important factor in that city's progress. A good citizen, therefore, convinced of the sincerity of purpose of the utility through its frank publicity methods, should give that utility the co-operation and support necessary to the successful operation of the company's business and the development of its plans for future improvement and extension of its service, directly benefiting the city as a whole and each individual citizen.

The utility realizes fully that not only its business patronage, but its right and privilege as a public servant, come from the people. It is the agent of the public and is responsible to the people. Its duty is to perform services which are of the greatest importance not only to the city as a community, but to every resident of the city. Therefore, the public has a vital interest in the company's success and should give approval and support to any plan that would add to the efficiency of the company's service.

Although of necessity all transactions between a city and a public utility must be carried on in formal manner and according to established rule, still every citizen has a share in any such transaction and a directly personal interest in it.

That is why the competent utility executive desires the people to know more about the business of his company, and why he is willing to pay for advertising space in the newspapers and elsewhere for the purpose of telling them about it.

The public utility is the best authority on matters pertaining to its own affairs. Just as much so as a great shoe house, drygoods firm or other industry is best informed pertaining to its own business. So-called "information" covering pertinent inside workings of any great industry from any other source than that industry itself is apt to be, and hardly without exception is, incorrect and misleading.

This, then, furnishes another reason why utilities find it necessary themselves to give such information as should enable the people to best understand the true situation with respect to these vital inside matters. No sane executive would do otherwise than state the facts accurately and fairly. For he knows that the true facts are the best arguments that can be put forth in his own behalf and is convinced that this form of argument will correct many false impressions which might otherwise exist.

It has been found that where a utility adopts this method of frankness with the public, the people do realize and appreciate that the interest of the public utility and the public are mutual.

The Proceedings of the First Annual Convention of the Telephone Pioneers of America is really an edition de luxe in blue and gold, tied with a silk cord. Its typography and illustrations are excellent.

A Lot of Loaded Lines

Trouble's a Wearisome Song.

People expect pluperfection;
Telephones mustn't go wrong.
Service should need no correction—
Trouble's a wearisome song.

Telephones mustn't go wrong—
Why leave it open to question?
Trouble's a wearisome song,
Better avoid the suggestion.

Why leave it open to question,
Hunting a cross or a ground?
Better avoid the suggestion;
Trouble's a sinister sound.

Hunting a cross or a ground,
Curing a faulty connection—
Trouble's a sinister sound,
Better to call it inspection.

Curing a faulty connection,
Disunite service and grief.
Better to call it inspection;
Trouble's a misfit belief.

Disunite service and grief,
Banish the doleful confession.
Trouble's a misfit belief;
Make a more cheerful impression.

Banish the doleful confession;
Conquer the faults in advance.
Make a more cheerful impression,
Never give trouble a chance.

Conquer the faults in advance,
Service should need no correction.
Never give trouble a chance;
People expect pluperfection.

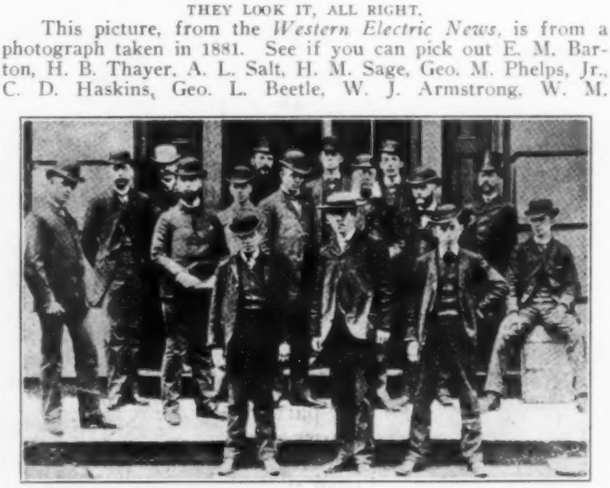
WE COULD MAKE A JOKE ABOUT CORN IN THE EAR, BUT WE'RE BUSY WRITING BLUEJAY FOR AN AD.

[Dispatch from Mt. Clemens, Mich., in the New York *American*.]

Complaining that the appliances that they wear on their heads cause corns to grow on their ears, thirty telephone girls have given the manager an ultimatum that they will strike if the contrivance is not changed.

THEY LOOK IT, ALL RIGHT.

This picture, from the *Western Electric News*, is from a photograph taken in 1881. See if you can pick out E. M. Barton, H. B. Thayer, A. L. Salt, H. M. Sage, Geo. M. Phelps, Jr., C. D. Haskins, Geo. L. Beetle, W. J. Armstrong, W. M.



Carpenter, Emery Farrar, H. D. Hill and others implicated in early Western Electric history. Think of all the hard things you have heard about W. E. and you cannot but agree with our theory that Paul Latzke must have seen this picture before he wrote "A Fight with an Octopus." We have always wondered where he got his inspiration. P. H. W.

Credit by Telephone in Department Stores

By E. I. Pratt

OUR great-grandfathers who first managed the general store of the country side, supplying everything from fish hooks for truant school boys to bonnets for the farmers' wives, had little need for a credit system beyond the sales check marks on the wall, or perhaps a laboriously followed record book.

The mammoth department store of today has evolved from that village emporium, and from the reckoning of the first general store keeper we have the modern department store credit system, wonderful in its accuracy and its speed.

With the small general store, the proprietor knows personally all his customers. Prices, credit terms, buying and selling plans are arranged orally to suit the occasions and circumstances. With the modern institution, composed as it really is of scores of specialty stores, no credit system of a personal nature is possible. Generally speaking, the oldest customers can only be known to a few clerks and department heads. With the constant changing of help some means must be employed so that one central executive body can instantly determine a purchaser's credit standing. This must be done, too, so that the buyer is hardly aware that any inquiry as to his account is being made.

The Cashier Inspector Reads, Over the Telephone, the Customer's Name.

We have all seen the housewife at the department store bargain counter, distressingly indignant because the clerks who waited on her did not remember her name, or because the urbane floor walker, when called in consultation, was in the same predicament, the result of the store's increasing size and multitude of customers. It is to do away with such arguments and delays that the telephone has been brought into service.

The Credit Man Signals the Cashier Inspector.

Numberless duplicate sales slips are in use, numberless schemes for checking credit applications, but until comparatively recently they all required that the purchase must go through several hands, be carried from place to place —always causing delay— something any purchaser objects to severely. Then, too, all of these systems left loop holes for error — temptations to dishonesty.

To do away with all this the National Cash Register Company uniquely combined the many advantages of its cash register system with the convenience of the telephone — the one checking the other and the combination producing a system of great speed and absolute accuracy; a system that removed temptation to dishonesty on the part of employees by making record or sales slip tampering impossible. Realization of the reliability and transmission quality of desk stand equipment manufactured by the Kellogg Switchboard and Supply Company has resulted in its use in this connection. In the crowded stores, with the constant noise and confusion, it is easily seen that clear, distinct transmission is absolutely essential.

With this new electrical credit system, the cashier in the department where the credit originates inserts a slip in the electrical stamping device attached to the desk telephone. This puts her in immediate communication with the credit man, usually located in the treasurer's office. He has the necessary data right at hand and as the credit is allowed he operates the proper key in a small switching box on his desk, which in turn automatically stamps the O. K. on the sales-

View Showing the Telephone Credit System in the Hub Store, Chicago.

slip by means of the electrical stamping device aforementioned, which is built into the cashier's desk instrument.

The dispatch with which this system operates makes it a very desirable equipment for large department stores which have a great deal of credit checking to handle. The entire credit situation is under the control of the credit man, as he is in instant touch with all parts of the store without leaving his desk.

The Kellogg Company has produced a great many desk stands for this special service, and owing to the increasing popularity of this speedy system, the output in the future will be much larger.

Further advantages of the telephone in connection with this system is that it does away with the large expense for motor power, necessary when pneumatic tubes or carriers are used. The electrically stamped sales slip gives the clerk the authority to deliver goods to the customer, or if the goods are to be sent it gives the cashier inspector authority to forward them to the delivery department.

If there is any doubt as to a customer's credit or identity, the telephone allows the credit man to give or receive any information necessary from the clerk, who takes up the matter directly with the customer and the clerk who made the sale. All parties concerned are present and the quick telephone information relieves customers of the embarrassment of having the man who sold the merchandise leave the customer in order to report at the credit office, occasioning great delay and retarding the service for other possible customers.

To show the ease with which a credit sale is handled with the aid of the telephone and this register system, let us follow through a transaction as it occurs. The clerk sells goods to a charge customer, and the first thing necessary is to know if the charge customer is the person he represents himself to be. There are many methods for making this identification and it is of as much importance to the credit customer as to the store.

The identity being assured, the clerk who sold the merchandise passes sales slip and goods to a cashier inspector, located conveniently in each department. The latter checks the sales slip items with the goods, at the same time noting the charge transaction. She then places the original sales slip in the electric stamp.

The cashier inspector then signals the credit clerk by raising the receiver hook. With this system it is not necessary to keep the receiver to the ear while waiting a reply. The credit clerk, when ready to answer, signals the cashier inspector with a ring. The latter then reads, over the telephone, the name and address of the customer and the amount of the sale from the sales slip in the stamp; then hangs up the receiver and goes about other work.

A concise and comprehensive credit customers' index is kept at the credit man's right hand and it is but the work of a minute to ascertain the information necessary. If the sales slip is O. K., the credit clerk pushes a key on his desk which stamps the sales slip in the telephone register of the cashier inspector, who in the meantime has had the customer's merchandise wrapped and made ready. All this takes but a minute or so and the stamped sales slip gives the clerk authority to deliver the goods to the sales clerk, who hands the package to the waiting customer.

The original sales tickets bearing the O. K. stamp of the credit man are collected from the cashier inspector's desk and taken to the credit office.

Credit Clerk Using Telephone at Register Desk.

What One Woman Thinks

By Sarah Elizabeth Brown

IF TELEPHONE progress must take Ohio for an example, I want none of it. I have been kind to Ohio. I have sung the praise of its telephone men and will continue to lay little laurel wreaths at their feet, individually and collectively, but I'm getting tired of this continued Ohio lethargy. It is more than a year since the Ohio legislature authorized the consolidation of telephone companies. It was a bill which telephone men seemed to want. Evidently they wanted it as an excuse to sit back and wait, for there has been less telephonic activity in that state since the law was made than ever before. Maybe the consolidations looked better before it was possible to merge than they do now, when an idle commission wants something to do. At any rate, Ohio is as dead as a smoked herring. The operators are all sawing wood waiting for the other fellow to make the first move. If they all get the same notion at once, we'll hear from the old Buckeye again, but right now there is nothing doing. Up in Cleveland, the Bell company wants to issue about a million dollars' worth of new securities—to pay off alleged existing debts. It struck a snag when the matter was presented at Columbus. Through the Bell attorneys the admission was made that the Cleveland Bell has been in the habit of borrowing money since 1900, in sums varying from $5,000 to $55,000. Over $300,000 has been acquired in this manner since last June and the aggregate, since the practice became chronic, exceeds $3,000,000. Quite natural, then, if more money is required, the commission gets to view the situation, and being the extremely dull commission season, it is bound to be inquisitive. So the book-keeper, who was sent down to Columbus, was trotted back home with the message that the president of the Cleveland Bell would probably stand a better show if he presented his case in person. Well, boys, when I'm negotiating a deal involving a million I'll be willing to spare a little of my own time in the matter. Upon second thought, though, suppose that I might have borrowed $3,000,000 on my notes. Oh, I wouldn't be so excited about it, after all!

* * *

But I would like to see some consolidating in Ohio. I want to know how it works out. I would like to know whether the people would be satisfied with the unified system—whether the promoter wouldn't get busy and try the starting of another competitor. Funny thing that Ohio citizens are so tolerant of the two-system nuisances, now that they have the remedial agency right under their thumbs. Take Cuyahoga for example. It goes right along adding about ten subscribers a day—plain demand—no solicitors, and it slips a hundred thousand cash into the discard every little while, which is my way of saying that it retires its obligations. It charges from its surplus direct to depreciation and credits plant value. More than three-quarters of a million has gone that route and you and I know that that simply means the plant is growing more valuable while representing less book value. On the other hand Cuyahoga would like to see the two plants in Cleveland under one management. The town is growing. It won't be long till either one or both companies must invade new residential districts at enormous expense, and duplication of plant in the face of threatened consolidation would be sheer waste. When I say a thing like that, I'm talking like an Ohio telephone man. Personally, that kind of waste looks like good business for the telephone manufacturer.

* * *

What's all the fuss about the city of Chicago trying to swipe the independent telephone system of that place? From what I can gather at long range it is a plain case of politics. The question hinges on whether the system had 20,000 subscribers a year ago. The franchise seemed to require something like that. Two years ago the franchise had a valuation of $1,000,000. Since then more than $3,000,000 has been spent in extending the system. Isn't it a little bit presumptuous on the part of an aldermanic committee to imagine they can go in and take over the property? Are the political henchmen so thick around the city hall that jobs must be created for the hungry horde? Better buy an adding machine and let the automatic p. b. x. operator check up the directory.

* * *

It were ever thus. If the independent telephone system survives it must be subjected to all the grief that can be invented. The problems of competition are mental terrors. I used to think that the sympathy of the public was with the under dog, but I'm changing my mind. Everybody, nowadays, wants to test the fighting qualifications of every new enterprise. And as a rule they insist on the acid test! Chicago isn't the exception.

* * *

Out in San Francisco a determined effort is being made to reinstate the Home Telephone Company as an active competitor in the operating field. Both the attorney-general for the state and the city attorney for San Francisco, have filed suits against the Pacific T. & T. Co. to declare illegal and set aside the merger of the Home. The attorney-general is asking the court to forfeit the Home franchise, claiming that the Pacific company has usurped it. The further charge is made that the Home company was acquired by exchanging Pacific stock for Home stock—that no money entered into the transaction. A temporary order is asked to issue to prevent the Pacific company from using the Home plant until the merits of the case have been heard. The Pacific company, so I've been told, has moved into the Home building, which adds further to the complications. Here we have all the earmarks of one of the prettiest scraps that has been instituted for a long time and if I know anything about California fighting tactics, somebody is going to get hurt.

* * *

On July 1, the Central Union Telephone Company will redeem at 105, $2,500,000 first mortgage 6 per cent bonds, due in 1916, and $3,500,000 consolidated mortgage 5 per cent bonds, due in 1919. Gee, ain't it great to have money!

Salt Lake City has but one telephone system, that of the Mountain States T. & T. Co. Nineteen days ahead of schedule, the independent subscriber was absorbed by the Bell, which has taken over everything, including all the employes of the independent operator. Indianapolis should send its committees to Salt Lake to see how the work was done.

* * *

But now that the Indiana independents favor a unified system at Indianapolis, maybe the mayor and his various committees will be able to get together on the proposition.

* * *

The Mackay Companies show the big chest when it gets right down to the subject of long green. In the annual report for the year ended Feb. 1, 1912, the president says: "The $12,000,000 realized about two years ago from the sale of A. T. & T. stock is still preserved intact . . . and this great fund is ready for emergencies, extensions or the taking up of a new line of business." Clarence H. Mackay doesn't give a darn who kicks his dog around. Think of a pile of boodle like that just merely rusting!

* * *

The U. S. I. directors have settled with Frank Downey of Rochester, returning that gentleman the amount he lost in the securities of the defunct company. There are 179 cases of more or less similar nature that have been filed against the U. S. I. directors and the Downey precedent gives each claimant a right to hope for the return of his money. An effort is being made to settle many of the claims out of court on the grounds that the men who are responsible for their payment cannot afford the time to be haled into court on 179 separate counts. Now that there has been a settlement at 100 cents on the dollar, there is less disposition among the defendants to accept anything but the face of their claims. The total amount of all the claims aggregates more than six and a half millions.

* * *

The Bell buying of automatic systems on the Pacific coast isn't just a plain case of turning over the money and getting title, after all. In Tacoma, a city attorney, backed by an indignant populace, is demanding that the Sunset company shall operate the Home plant, automatic, or forfeit the Home franchise. Inasmuch as the Home property has been practically dismantled, the task of putting it back into shape would be equivalent to rebuilding. The Sunset franchise expires in 1915 and the company has doubtless planned to go right along on the Home franchise after that. The city attorney is emphatic in saying that the Sunset must have a new franchise when its old one runs out and that the Home company alone has a right to operate on its franchise. So there the matter rests. If Tacoma believes in its city attorney it will see to it that he succeeds himself in office indefinitely!

* * *

My old friend John Howard, of National Tel. repute, is on the boards again. Isn't he sassy? It was Howard, you will remember, who was to put on the map a big rival company for the Bell. He was the hottest of the red hot promoters who flirted with the telephone game. Now he's dragging his old organization into court and with it his brother-in-law Handlan and S. W. Harper and Cyrus Huling, and others, with sensational affidavits that his co-workers have been trying to dispose of his pet scheme without reckoning with their host. It's all very sad. According to Howard, the National was to have been financed in several subcompanies and the Bell was to own everything while operating in the guise of independent. Mercy, what a scandalous program! And to think that stuff like this would get into the hands of the Associated Press.

* * *

The Lincoln Telegraph & Telephone Company is near neighbor to the Nebraska Railway Commission, which has a lot to say about telephone business. The commissioners, due largely to the activities of the Lincoln operator, have adopted a nice little code of ethics that is used in all their transactions. If a subscriber is delinquent in his telephone rental, the old screw-driver method of collection is tabooed. You must report the case to the commissioners, who have a neat little form they fill out for your collector to proceed upon. If you fail to comply with these little niceties you may have trouble with your next bond issue, or something akin to it. In Lincoln you must beware of the official dignity at the state house. And that isn't half the Lincoln company's trouble. The central labor union has set up a howl because the business, or direct line rate has been advanced to $5. Before the merger of the two plants in Lincoln, the rate was $4 for each! It is a terribly thankless world, isn't it? But there is this consolation, the Lincoln system will displace its manual with full automatic as fast as the work can be done and then that old sorehead in the labor temple can talk to himself, using all his pet phrases at once. If the telephone is in the basement, so much the better.

* * *

I wish Grandma Bemis would hurry up those Chicago rate figures. It won't be long till I'll be busy with my canning and I can't stop to look at them then. Gracious, but he's slow! How big was that appropriation?

* * *

Well, we've finally got our winter wheat ground into oats and the corn has been planted, but it was some job—mostly with winter duds, all the way. Believe me, I'll never go crazy about gentle spring again—not with the first day of it.

Counterfeit Coins in Pay Stations

It is probable that a United States commissioner will be called upon to decide if the placing of counterfeit coins in pay stations of telephone companies is to be classed as passing counterfeit money. The case of C. E. McElroy, who was tried before Judge Watts at Birmingham, Ala., raises this point.

McElroy was arrested by local detectives; it is charged by the Southern Bell Telephone company that he deposited in the long distance pay stations at the Morris and Metropolitan hotels counterfeit coins of fifty, twenty-five and five cent denominations.

Captain E. P. McAdams, secret service agent for the United States government, is at work on the case against McElroy and three or four employees of the Southern Bell Telephone company have been summoned as witnesses in the case.

It is alleged that McElroy received certain coins in exchange from the telephone company for the alleged spurious coins.

Automatic Selection on Multiple Boards

By Alfred H. Dyson*

THIS paper will discuss means and certain results obtained by the application of selective switches to common battery multiple telephone switchboard systems.

The manual common battery multiple telephone switchboard system has now been in commercial use in practically all of the larger cities for more than a decade. As at present used its arrangement has reached the limit of development and is structurally the least complex of all telephone systems adapted to provide service for a large number of subscribers, but when applied to the larger sized exchanges it is found to be very expensive in first cost and also is believed to be unnecessarily expensive in operation. Its first cost increases in an increased ratio with the increased number of lines. This is also true of its operation, for the reason that with the increase in number of subscribers' lines the number of calls per line per day also increases, with the result that the ratio between the number of lines and the number of operators for effecting the connection of such lines is decreased, that is, the percentage of operators to lines is increased.

Briefly, the arrangement of the manual multiple switchboard system, as now in use, is such that each subscriber's line terminates on the switchboard in an answering jack with which is associated a signal lamp and multiple jacks, there being as many multiple jack terminals of each line as there are sections of switchboard—each section consisting of three operators' positions. For the interconnection of a line as a calling line with a line as a called line there are provided what are termed connecting cord circuits, each provided with a pair of plug terminals known as answering and calling plugs, and a pair of signal lamps termed answering and calling supervisory lamps. Each cord circuit is in addition provided with keys which enable the operators to connect in circuit their telephone apparatus and to establish circuit for the ringing current for actuating the signal bells of the substations. There are placed before each operator answering jack terminals of as many lines as an operator is capable of establishing connections for and as many connecting cord circuits—usually about fifteen—as are required to establish such connections at the busiest moment.

If it be a multi-office exchange, there are provided multiple jack terminals of trunk lines which lead from each office to each of the other offices of the exchange, there being a multiple jack terminal of each trunk within the reach of each subscriber's operator. In addition there are provided in each office as many incoming trunk circuits as may be required to handle the connections trunked into a particular office from the other offices. These circuits are each provided with two signal lamps termed calling supervisory and disconnect lamps, and keys for establishing circuit for current for actuating the signal bells of the called substations. These incoming trunk circuits usually terminate in connecting plugs before special operators, usually called trunk or B operators, as distinguished from the subscribers' operators, who are sometimes called A operators. There are as many incoming trunk circuits placed before each such operator as may be handled by an operator during the busiest moment, i. e., during the moment of the greatest number of coexisting trunk connections. Usually an operator is provided with about 30 such circuits. There is also provided before the incoming trunk operators a multiple jack terminal for each line of the office, there being one such terminal for every three or less operators.

The operation of the multiple switchboard system is such that upon the removal of the receiver from the switchhook by a calling subscriber the line signal lamp of the line of such subscriber is automatically illuminated. The operator before whom said lamp is located, upon observing that it is lighted, inserts the answering plug of an idle cord circuit into connection with the answering jack of the line of the subscriber, and by the actuation of a key associated with the cord circuit it is connected telephonically with the calling subscriber. The operator

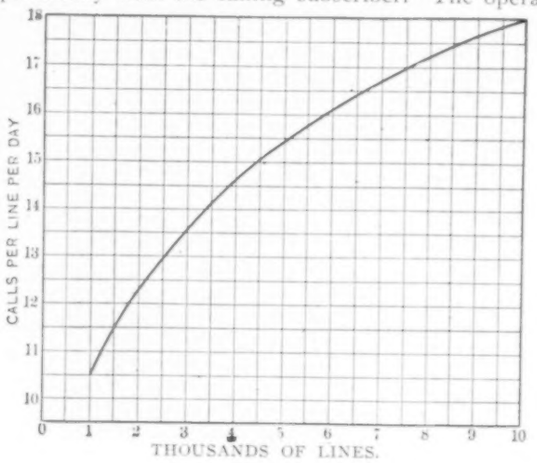


FIG. 1.

Calls per line per day in exchanges varying from 1,000 to 10,000 lines. Flat rate service.

thus ascertains the number of the called subscriber. If be a single office exchange, the operator by touching the sleeve terminal of the multiple jack of the line of the wanted subscriber with the tip of the associated calling plug of the cord circuit ascertains the busy or idle condition of the line. If the line be busy the calling subscriber is notified that connection cannot be established. If the line be idle she then inserts said calling plug into connection with the said multiple jack terminal and actuates a key associated with the cord circuit, which results in the transmission of current over the called line to actuate the substation signal bells. The projection of the ringing current thereafter continues periodically until the removal of the receiver from the switchhook of the called substation, at which time the ringing current is permanently disconnected from the line and the calling and called subscribers automatically placed in telephonic connection. Whenever the plugs of a cord circuit are in connection with a line and the receivers off the switchhooks the supervisory lamps are in their normal or unlighted condition, but upon replacing the receiver upon the switchhook at the calling substation the answering supervisory lamp is illuminated,

*A paper presented at the Pacific Coast Meeting of the American Institute of Electrical Engineers, Portland, Ore., April 16-20, 1912.

and upon replacing the receiver upon the switchhook at the called substation the calling supervisory lamp is illuminated. The principal object of these lamps is to inform the operator when disconnection is desired, i. e., when the plugs of a cord circuit should be disconnected from the jack terminals of the lines. This is done when the two connected subscribers replace their receivers upon their switchhooks after completion of conversation. These lamps are also used for the purpose of signaling the operator after a connection has been established if her assistance is desired.

If it be a multi-office exchange and a calling subscriber desires connection with a subscriber whose line terminates in some office other than the office in which the line of the calling subscriber terminates, then the operator would communicate—by means of a call circuit—with an incoming trunk operator, in the office in which the called line terminates, giving to the incoming trunk operator the number of the line of the called subscriber. The incoming trunk operator, upon ascertaining the number of the called subscriber, assigns a trunk to be used. Upon assignment of such trunk the subscriber's operator inserts

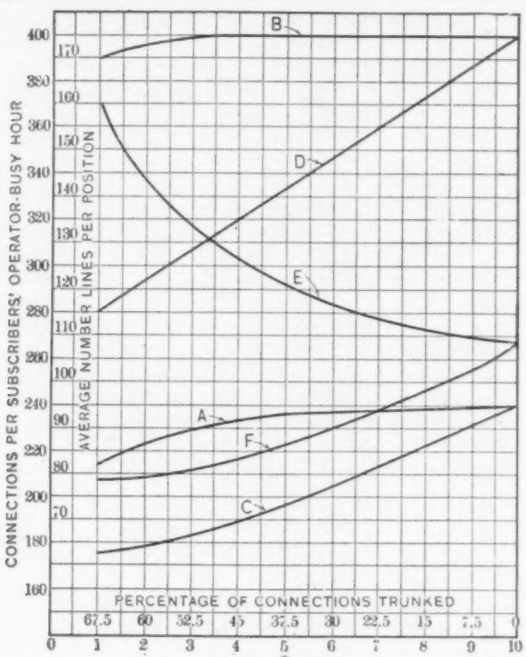


Fig. 2.

Curve *A* shows average number connections (busy hour) per operator, in a single office manual exchange of from 1,000 to 10,000 lines.

Curve *B* shows average number connections (busy hour) per operator, in a single office automatic call distributing exchange of from 1,000 to 10,000 lines.

Curve *C* shows average number connections (busy hour) per operator, in a multi-office manual exchange of 10,000 lines (18 calls per line per day) when certain percentages of calls are trunked.

Curve *D* shows average number connections (busy hour) per operator, in a multi-office automatic call distributing exchange of 10,000 lines (18 calls per line per day) when certain percentages of calls are trunked.

Curve *E* shows average number lines per operator's position in a single office manual exchange of from 1,000 to 10,000 lines.

Curve *F* shows average number lines per operator's position in a multi-office manual exchange of 10,000 lines (18 calls per line per day) when certain percentages of calls are trunked.

the calling plug associated with the answering plug inserted in the answering jack, into connection with a multiple jack terminal of the trunk assigned. The incoming trunk operator, upon ascertaining the number of the called subscriber, by touching the sleeve of the multiple jack terminal of the line of the called subscriber with the tip of the plug of the trunk circuit assigned ascertains the busy or idle condition of the called line. If such line be busy the calling subscriber is notified by means of a suitable signal. If the called line be not busy the incoming trunk operator inserts the plug of the assigned trunk into connection with the multiple jack terminal of the called subscriber, and actuates a key associated with the assigned trunk, which results in the projection of current over the line to actuate the signal bells of the called substation. This ringing current continues periodically until the removal of the receiver at the called substation, or until the removal of the trunk plug from connection with the multiple jack of the line called. Upon removal of the receiver from the switchhook at the called substation the ringing current is permanently disconnected from the line and the two subscribers automatically placed in telephonic connection. The signal lamps associated with each incoming trunk circuit indicate to the incoming trunk operator when disconnection should be effected, which is accomplished by simply removing the trunk plug from connection with the multiple jack terminal of the line.

The introduction commercially of the automatic telephone system has resulted in the production of a modified form of multiple switchboard system. This system I shall herein term the "automatic call distributing system." This system materially reduces the cost of operation and also in the larger central offices reduces the first cost of the central office equipment.

The arrangement of the automatic call distributing system differs from that of the manual system in that the answering jacks, their associated line lamps and the answering cords of the cord circuits are eliminated. In lieu thereof, automatic selector switches are provided which, upon the removal of the receiver from the switchhook at a calling substation, automatically connect a calling line with the first idle connecting cord circuit to which the calling line has access. In other words the calls are automatically distributed before the operators. There are a number of arrangements of switches for accomplishing this result.

By one arrangement a small ten-point switch is provided for each line and a sufficient number of 100-point switches to accommodate the maximum number of coexisting connections. This arrangement acts in such a way that upon the removal of the receiver from the switchhook at a calling substation the ten point switch associated with the line is automatically rotated to select an idle one of ten 100-point switches which, upon selection, is automatically actuated to select and connect with an idle one of 100 connecting cord circuits. Upon the completion of the second selection a signal lamp associated with the selected cord circuit is automatically illuminated, indicating to the operator, before whom such selected cord circuit is located, that a connection is desired.

Another arrangement is to provide a 100-point switch for each connecting cord circuit and a number of 100-point line selector switches equal to the number of the maximum coexisting connections at the busiest moment of the day. The operation of this arrangement is such that upon the removal of the receiver from the switchhook, a switch associated with an idle cord is automatically actuated and selects an idle line selector, which said line selector is adapted upon its selection to automatically select a multiple terminal of the calling line. When this selection has been made a lamp signal associated with the selecting cord circuit is displayed before the operator, indicating that a connection is desired.

Another arrangement is to divide the lines as calling lines into groups of 100 lines each and to provide for each group of 100 lines as many 100-point line selector switches as there will be coexisting calls in the associated group of 100 lines during the busiest moment of the day. To each line selector switch is electrically connected a 100-point cord selector switch. The operation under this arrangement is such that upon the removal of the receiver from the switchhook, by a calling subscriber, an idle one of the line selectors and its associated cord selector are actuated. The line selector automatically selects and connects with a multiple terminal of the calling line, and the cord selector automatically selects and connects with a multiple terminal of an idle cord circuit. Upon such selection of the line and cord, a signal lamp associated with the selected cord is illuminated, indicating to the operator before whom the cord and lamp are located that a connection is desired. The operator observing the lighted condition of the lamp, after actuation of a key associated with the said cord circuit, ascertains the number of the wanted substation. Thereafter—if it be a single office exchange—the operator, by touching the sleeve of a multiple jack terminal of the line of the wanted subscriber with the tip of the connecting plug of the selected cord circuit, ascertains the busy or idle condition of such line. If the line be busy she notifies the calling subscriber that connection cannot be completed. If the line be idle she inserts the connecting plug into connection with the multiple jack and actuates a key associated with the cord circuit, which projects over the called line current which actuates the signal bells of the substation of the called subscriber. This signaling current is maintained periodically until the removal of the receiver from the switchhook at the called station. Upon such removal the signaling current is automatically disconnected and the two subscribers placed in telephonic connection. Associated with the connecting end of each cord circuit is a signal lamp termed a supervisory lamp, which indicates to the operator when the called subscriber removes the receiver from the switchhook and also when the receiver is replaced. The call signal lamp associated with the answering end of the cord circuit acts also as a supervisory lamp which indicates, after connection with the called line, when the receiver at the calling substation is off or on the hook. After completing conversation the two subscribers, by replacing the receivers upon their respective switchhooks, cause the illumination of the two supervisory signal lamps, which indicates to the operator that disconnection is desired, which she accomplishes by removing the connecting plug from connection with the multiple jack terminal of the line of the called substation.

If it be a multi-office exchange and if a calling subscriber desires connection with a line terminating in some other office, then the connection is trunked to the distant office and established as desired in connection with the manual system.

In order to arrive at the difference in the number of operators required and the difference in first cost between the two systems, it is necessary to know,

1. The number of calls per line per day.
2. The number of calls originating during the busiest hour.
3. The number of connections an operator can establish in a single office exchange during the busiest hour.
4. The number of connections an operator can establish in a multi-office exchange during the busiest hour.

Upon the number of calls per line per day and the number of calls an operator can establish during the busiest hour, will depend the number of lines which may be assigned as calling lines to each operator. On the number of lines assigned to each operator will depend the number of operators' positions required to handle the traffic during the busiest hour. It is also necessary to provide connecting apparatus to accommodate the maximum number of coexisting calls at the busiest moment.

For the purpose of this discussion I shall not consider flat rate service, including individual lines and a fair development of selective party lines.

In order to determine the number of calls per line per day in exchanges of various sizes and the number of connections an operator can establish in both a single office exchange and a "multi" office exchange during the busiest hour, I have had reference to "peg counts" of various exchanges approximating the sizes to be discussed.

The curve of Fig. 1 illustrates the average number of calls per line per day in exchanges varying from 1,000 to 10,000 flat rate lines. I do not claim this curve to be exact for any particular exchange, as local conditions are usually such as to cause a divergence, but it is a fair approximate average.

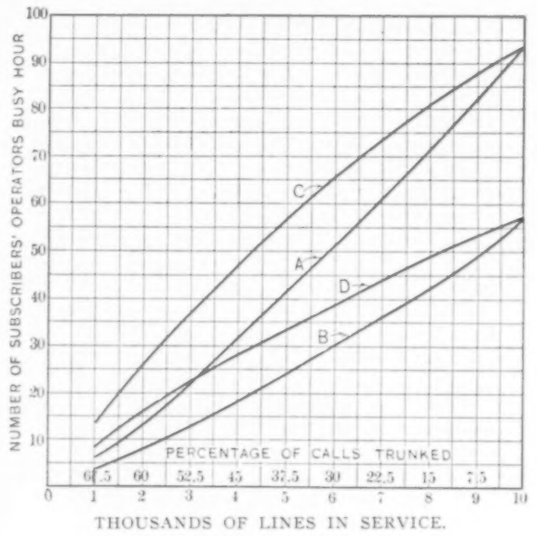


FIG. 3.

Number subscriber's operators required during busy hour, as per Figs. 1 and 2.

Curve *A* represents single office manual system, 1,000 to 10,000 lines.

Curve *B* represents single office automatic call distributing system, 1,000 to 10,000 lines.

Curve *C* represents multi-office 10,000-line exchange, manual system, 18 calls per line per day.

Curve *D* represents multi-office 10,000-line exchange, automatic call distributing system, 18 calls per line per day.

Curve *A* of Fig. 2 illustrates the average number of connections which operators in single office exchanges varying from 1,000 to 10,000 lines can establish during the busiest hour. It will be seen upon inspection that the number increases with the number of lines of the exchange. This is attributed to the fact that in the smaller exchanges the operators are less efficient and that the fewer the number of calls per line per day the less the regularity with which the calls originate, which results in a greater number of idle periods.

From curve *A* of Fig. 2 has been plotted the curve *E* of Fig. 2 which illustrates in single office exchanges varying from 1,000 to 10,000 lines the number of lines per operator's position, when the number of calls per line per day varies from 10½ in 1,000 line offices to 18 in 10,000 line offices. It may be observed that although in the larger exchanges an operator can establish a

greater number of connections per hour, nevertheless the number of lines allotted as calling lines to each operator is decreased, owing to the fact that the number of calls per line per day is increased.

Curve *C*, Fig. 2, sets forth the average number of connections an operator can establish in multi-office exchanges of 10,000 lines, at 18 calls per line per day—when various percentages of calls are trunked--during the busiest hour.

The percentage of calls trunked from any office has been arrived at by application of the formula

$$\text{Trunking per cent} = 100 \frac{A - B}{A} 0.75$$

wherein *A* is the total number of lines in the exchange, *B* the number of lines in the office under consideration and 0.75 is a factor which allows under ordinary conditions for the community of interest between the subscribers of the office. It is obvious, under the conditions assumed, that the greater the percentage of calls trunked, the fewer calls an operator can establish during the busy hour.

From curve *C* of Fig. 2 has been plotted curve

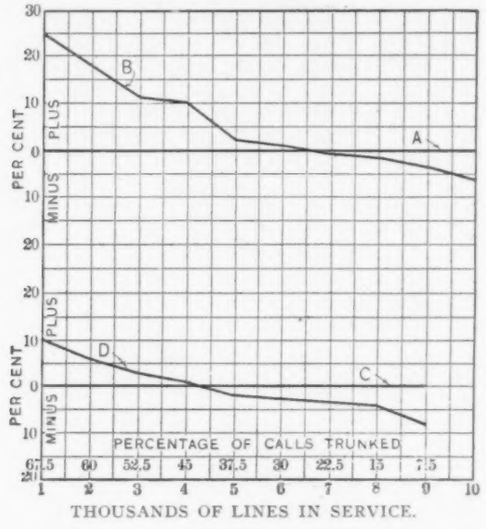


Fig. 4.

Curves *A* and *B* represent percentage differences in cost of a single office exchange of from 1,000 to 10,000 lines. Curve *A* represents manual and curve *B* represents automatic call distribution.

Curves *C* and *D* represent percentage differences in cost of a multi-office 10,000-line exchange (18 calls per line per day) when certain percentages of calls are trunked. Curve *C* represents manual and curve *D* represents automatic call distribution.

F of Fig. 2, which sets forth the average number of lines which may be assigned to each operator in a multi-office system operated under the conditions of curve *C*, Fig. 2.

As there is not in commercial use an exchange operating under the automatic call distributing system, I have of course, been unable to ascertain the actual number of calls an operator could establish during the busiest hour, but have assumed that there will be required in a single office exchange, according to the curve of Fig. 1, nine seconds for the establishment of each connection, from which assumption I have plotted curve *B* which shows the average number of connections an operator can establish during the busy hour, by means of the automatic call distributing system.

Allowing seven seconds additional for each connection trunked, i. e., 16 seconds for each trunked connection, I have shown by curve *D*, Fig. 2, the average number of connections an operator can establish in a 10,000-line multi-office exchange, in the busy hour, in offices varying from 1,000 to 9,000 lines when certain percentages of calls as shown are trunked. As mentioned in reference to curve *B*, this is estimated, owing to the fact it is impossible to obtain the information from actually working commercial exchanges.

The vast difference in the number of connections per operator per hour between the two systems appears abnormal, but it is believed a little thought will convince the reader that the conclusions are correct and will be borne out in commercial practice.

Having arrived at the difference in number of calls per operator per hour, in each of the systems, it is next in order to consider the difference in the number of operators required to handle the traffic of the exchanges during the period of the peak of the load, i. e., during the busiest hour. In order that this may be readily ascertained I have plotted the curves of Fig. 3, in which curve *A* is based upon the results of the curve of Fig. 1 and curve *A* of Fig. 2 and shows the number of operators required to handle the traffic of a single office manual multiple switchboard system during the busiest hour. Likewise curve *B* of Fig. 3 is based upon the results of the curve of Fig. 1 and the curve *B* of Fig. 2 and shows the number of operators required to handle the traffic of a single office automatic call distributing system exchange during the busiest hour.

Curve *C*, Fig. 3, is plotted from curve *C* of Fig. 2 and shows the number of operators required, in a multi-office manual multiple switchboard exchange of 10,000 lines, at 18 calls per line per day, to handle the traffic of an office of a particular number of lines during the busiest hour when the percentages of connections, as shown, are trunked.

Curve *D* of Fig. 3 has been plotted from curve *D* of Fig. 2 and shows the number of operators required in a multi-office automatic call distributing exchange of 10,000 lines, 18 calls per line per day, to handle the traffic of an office of a particular number of lines when the percentages of connections as shown are trunked. The difference in number of operators in the two systems will, by inspection of the curves of Fig. 3, be apparent. As stated, the curves of Fig. 3 set forth the number of operators required during the busiest hour. It will, however, be understood by all traffic men that the number of operators required at all other hours of the day may be accordingly reduced.

Having ascertained the number of operators required for the operation of an exchange of given size, both single and multi-office, the annual saving in operators' wages and other costs incidental thereto may be readily ascertained. The saving is found to be at first glance almost inconceivable, but it is believed by the writer that the ratio will be approximately borne out in commercial practice.

While the automatic call distributing system has been well developed by at least one interest and it is understood also by others, the possible variations in the methods by which the result may be accomplished, three of which have been herein described, leave wide room for variation in the first cost of equipment for producing in exchanges of various sizes the operating results which I have set forth. It may be said that each of the outlined ways of accomplishing the results of automatic call distribution will maintain the advantages indicated by the curves.

In view of the possible wide differences in amount of equipment, depending upon the particular system preferred, and also for other reasons which a little thought will make apparent, it will be understood that the difference in relative percentage of first cost of manual systems and the automatic call distributing system will vary. The question of cost has, however, been given careful attention by the writer and figured out for a particular system. As a result I have plotted the curves of Fig. 4 which are intended to show difference in percentages of first cost of all central office equipment with the exception of long distance equipment.

The curves *B* and *D* of Fig. 4 are not based on apparatus built for commercial use, but are estimated on what, in the opinion of the writer, the apparatus will cost installed.

Curves *A* and *B* of Fig. 4, wherein curve *A* represents manual and curve *B* automatic call distributing, are intended to show the percentage difference in first cost of the central office equipment, exclusive of long distance equipment, of single office exchanges varying from 1,000 to 10,000 lines, when the number of calls per line per day vary according to the curve of Fig. 1.

The curves *C* and *D* of Fig. 4, wherein curve *C* represents manual and curve *D* automatic call distributing, are intended to show, in multi-office exchanges of 10,000 lines, the percentage difference between the two systems in first cost of the central office equipment, except long distance equipment, of offices of the particular number of lines as shown, when the number of calls per line per day is 18, and when the percentage of connections as shown, are trunked.

An inspection of the curves will show the first cost in single office exchanges of the central office equipment of an automatic call distributing exchange of 6,750 lines or less to be greater than that of a manual exchange of equal number of lines, while for single office exchanges of a greater number of lines the first cost of the automatic call distributing becomes less than that of a manual exchange of like number of lines.

In multi-office, 10,000-line exchanges operating under conditions hereinbefore set forth, the first cost of the central office equipment of the automatic call distributing system is less than that of the manual system, when the size of an office exceeds about 4,300 lines.

Thus from the above we find, under the conditions herein assumed, that the cost of operation of the automatic call distributing system is, for all sizes of exchanges, less than that of the manual multiple telephone switchboard system, and that for the larger sized offices, i. e., offices of the greater number of subscribers' lines, not only the cost of operation, but also the first cost of the automatic call distributing system is less than that of the manual system.

In considering cost of operation I have not so far taken into consideration the relative cost of maintenance. As the switches for accomplishing automatic call distribution are more complex than the central office apparatus used in the manual system, the cost of the maintenance of these switches will somewhat increase, in the writer's opinion, the total annual maintenance cost of the central office apparatus. But it must be understood that the amount of the apparatus which would be used in the manual system is decreased, when automatic call distribution is applied, the result being that the increased annual maintenance cost of the automatic call distributing system, owing to the selective switches, over that of the manual system, will be very slight; it may in fact be considered negligible, when compared with the great saving in operators' expense.

What I have hereinbefore stated has had reference particularly to new installations of central office equipment. Before concluding the discussion I will state that automatic call distribution may with economy be applied to existing exchanges. As an example, considering a single office exchange of say 6,000 lines, it is found by reference to curve *A*, Fig. 3, that without automatic distribution approximately 51 operators are, during the busiest hour, required to handle the traffic, while with automatic call distribution with the same number of operators (see curve *B* of Fig. 3), the traffic of approximately 9,300 lines may be handled during the busy hour. Thus by installation of the automatic call distribution apparatus and the necessary multiple jack terminals for the number of lines over and above 6,000 lines, the number of lines of the exchange may be increased approximately 55 per cent. Thus with only the number of operators necessary to handle the traffic of the original 6,000-line manual exchange, the traffic of an exchange of 9,300 lines may be handled. The cost of additional equipment necessary to accomplish this result, it is believed, would not be greater than the cost of the equipment necessary to increase a manual exchange from 6,000 to 9,300.

Or, if it is not desired to increase the number of lines of the exchange, the cost of operation may be reduced by the installation of the apparatus necessary for automatic call distribution, and it is believed that the decrease in cost of operation will be much greater than the interest on the additional investment and the additional cost of maintenance of the automatic call distribution apparatus.

Another manner in which automatic call distribution may be applied to existing exchanges is to install equipment necessary to handle the traffic during the busiest hour with automatic call distribution apparatus and thereafter, by dividing the switchboard including the multiple equipment, utilize the positions not then required, as a separate switchboard, which may then be equipped with the automatic call distribution apparatus and by installation of trunking apparatus and circuits, the exchange may be converted into a multi-office of a greater number of lines. The increase in number of lines will depend upon the number of operators' positions of the original equipment saved by the change.

Either of the above changes from the manual system to the automatic call distribution system can be accomplished without impairing in any manner the efficiency of service, as the change may be made on each position of the switchboard and on each line without disturbing in any manner the other positions or lines of the office.

None of the above could be accomplished if it should be attempted to change from the manual multiple switchboard system to any other system other than the automatic call distribution system.

Should the attempt be made to change an existing manual exchange to an automatic exchange, not only would the numbers of the substations of all the lines have to be changed, requiring a new directory and confusion on the part of the subscribers, but all of the telephones would have to be changed or replaced and an entire new switchboard provided, incurring enormous expense in addition to confusion and probable dissatisfaction in service.

Should the attempt be made to change an exchange from a manual multiple switchboard system to the so-called "auto-manual" system, the same confusion in refer-

ence to change in numbers on the part of the subscribers would be present, and in addition it would mean the installation of a new switchboard equipment of apparatus of greater amount and complexity than would be required even in a full automatic system.

A telephone company has but two objects—to give satisfactory service to its subscribers and a reasonable return to its stockholders on the capital invested.

In accordance with all that has been said, it is firmly believed by the writer at this time, that—excepting possibly the largest exchanges—when all items of expense are considered, and especially in reference to existing manual exchanges, the automatic call distribution, as herein explained, will be found to be more economical and satisfactory than any other known telephone system adapted to give satisfactory service to its subscribers.

Indiana Independents in Convention

The seventh annual convention of the Indiana Independent Telephone Association was held in the Claypool hotel, Indianapolis, May 15 and 16. The sessions were well attended and a good interest manifested throughout. One of the chief subjects under consideration by the convention was the movement recently started in Indianapolis toward the proposed merger of the Indianapolis Telephone Company and the Central Union Telephone Company, considered by independent telephone men of the state as one of the most important questions that they have had to face in years.

In his address of welcome, Mayor Shank expressed himself as being in favor of the merger, providing the outside companies were taken care of, as well as the residence subscribers in the city; that the residence service and rates must be satisfactory.

In its closing session the convention went on record in favor of a merger of the two companies under the franchise of the Indianapolis Telephone Company. The resolution presented by a committee appointed by President Hunter, consisting of J. A. Brown, of Winchester, F. E. Bohn, of Wabash, and L. B. Morris, of Lafayette, was as follows:

Whereas, The Indiana Independent Telephone Association recognizes that there is a growing sentiment in the city of Indianapolis in favor of the unification of telephone service, and that this is desirable where it can be accomplished in fairness to the public, as well as to the telephone companies, and

Whereas, An effort has been made recently to bring about unification of the two telephone systems in Indianapolis under a proposed new franchise which did not, in the opinion of the official representatives of this association, protect the interests of connecting independent telephone companies outside of Indianapolis, and such proposed franchise was therefore opposed on behalf of this association;

Whereas, The franchise of the Indianapolis Telephone Company does amply protect the interests of all independent companies in Indiana connecting with the service in Indianapolis, and

Whereas, The joint committee representing five commercial and civic bodies of the city of Indianapolis have recommended unification of telephone service in said city under the franchise of the Indianapolis Telephone Company; therefore, be it

Resolved, That the Indiana Independent Telephone Association heartily joins in this recommendation for unification under the franchise of the Indianapolis Telephone Company, and recommends that franchise as one that adequately protects the interests of independent telephone companies outside of Indianapolis, and as containing provisions fair to the patronizing public in order that it shall remain a domestic corporation locally controlled.

President Hunter in his address recommended that the association endorse the merger of the two companies under the franchise of the Indianapolis Telephone Company in the belief that said franchise fully safeguards all outside telephone companies.

Another subject which received considerable attention was that of a public utilities commission to have charge of the telephone interests of Indiana. This was the chief thought of the paper presented by Manford Savage, of Champaign, Ill., president of the National Independent Telephone Association. He also urged close co-operation among officers of independent companies.

In a talk by N. G. Hunter, of Wabash, Ind., president of the association, the same idea was brought out. This led to a general discussion. The feeling seemed to be that until the state feels itself able to establish a special commission all matters relating to telephone affairs should be put up to the railroad commission. It was urged, however, that a utilities law be carefully prepared and presented at the next session of the legislature on the ground that this will give a stability to the independents heretofore unknown and assure them of ready financing.

The officers elected for the coming year were as follows. President, N. G. Hunter, Wabash; vice-presidents, William L. Moellering, Ft. Wayne; Walter J. Uhl, Logansport; F. O. Cuppy, Lafayette; Frank White, Portland, and Henry Landgrebe, Huntingburg; secretary-treasurer, Walter J. Uhl; executive committee, N. G. Hunter, Walter J. Uhl, H. F. Farwell, Terre Haute, F. E. Bohn, Ft. Wayne, J. A. Browne, Winchester, William Fortune, Indianapolis, and Fred Parrott, Princeton.

At the closing session several members made an appeal for a campaign to increase the membership of the association. The membership has remained almost stationary during the year.

At the session of Wednesday afternoon the Toll Clearing Company elected the following directors: N. G. Hunter, Wabash; T. E. Bohn, Ft. Wayne; J. A. Browne, Winchester; W. J. Uhl, Logansport; George W. Beers, Ft. Wayne; Daniel Agnew, Rochester; W. W. Harbaugh, Sullivan; F. R. Strickler, Franklin; M. L. Early, Greenfield; W. L. Bailey, Richmond; William Fortune, Indianapolis. The officers of the company are: President, William Fortune; vice-president, J. A. Browne, secretary-treasurer, W. J. Uhl.

Kansas Has Model Line

A rural line in Douglas county, Kansas, having only nine subscribers, enjoys the distinction of being the most model telephone line in Kansas. It is part of the Home system and serves a few farmers in Wakarusa just east of the county farm.

The line was built a few months ago through the influence of Riley Shirar and Charles Gaumer. It replaced an old zig zag line which rendered unsatisfactory service and was costly to operate. The new line gives central energy service.

The poles supporting the wires are of walnut and will last two generations.

According to the Japanese department of communications, the number of new telephones to be installed this year is 27,000, the expenditure being estimated at $3,200,000. New exchanges are to be established in Osaka and Kobe.

The Telephone Scrap Book

Another Long-Distance Speech

THE illustration on this page is a partial view of the "smoker" to the Texas Press Association at Temple, Texas, May 18, at which the greatest telephone event to date in long distance speech making was achieved.

Vice-President Bloom, of the Bell system in the Southwest, addressed the assembly for ten minutes from his home at St. Louis, Mo. There were 215 persons with individual receivers in the banquet hall at Temple. Mr. Bloom was followed in one minute by J. E. Farnsworth, first vice-president of the Southwestern Telephone & Telegraph Company, with a twelve minute address from his home at Dallas, Texas. Mr. Farnsworth was followed in one minute by Judge Samuel R. Scott with a fifteen minute address from his home at Waco, Texas, and the great event was brought to a close by an address from Frank B. Knight at Temple.

The wire distance from St. Louis to Temple is approximately 1,000 miles; from Dallas to Temple about 135 miles, from Waco to Temple about 35 miles. No. 8 wire circuit was used with standard repeaters at Temple. The circuit from St. Louis to Dallas was loaded with Pupin coils, while the Dallas-Temple end was not so equipped, which makes the undertaking the more remarkable.

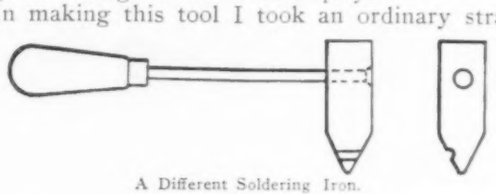
At each plate on the seven long tables a 600-ohn watchcase receiver was hung under the table, all being wired on a circuit devised by Chief Engineer Yenson of the S. W. T. & T. Co. On the ceiling, directly over the toastmaster, was suspended a triple microphone, sometimes called a "dictaphone," by which the applause of the listeners was transmitted to the speaker. The toastmaster was supplied with a desk telephone and he conversed with each speaker before and after the addresses. The local batteries, switches, repeaters, meters and attendants' apparatus was located in an anteroom.

This "big talk" was a greater step forward than that of February 17 from New Haven, Conn., to the Yale Club at Chicago, because of the greater engineering problems combated. It was planned and carried out by J. M. Carroll, district commercial manager of the Southwestern Telephone and Telegraph Company, at Temple, Texas, with the co-operation of Chief Engineer Yensen of the same company and B. B. Switser of the A. T. & T. Co. of Kansas City.

A New Kind of Soldering Iron

I HAVE found the soldering copper illustrated here to have several advantages over the regular straight tool, especially when wire joints near a ceiling have to be soldered, says Henri Picard in the *Electrical Review*. By the use of a tool of the kind illustrated I have saved myself from many a burn which would have been inflicted by falling pieces of hot solder if a straight soldering iron had been employed.

In making this tool I took an ordinary straight



A Different Soldering Iron.

iron and removed the copper portion from the stem. I then drilled a hole through the copper as indicated, making the hole slightly smaller than the rod to be inserted. The rod was then filed to a slight taper, driven through the hole and riveted on the end. Then I filed a groove crosswise in the copper near pointed portion, the purpose of this groove being to hold the melted solder, which otherwise would have a tendency to roll off as fast as applied.

In using this soldering iron the groove is filled

Texas Press Association Members Listening to Long Distance Speeches.

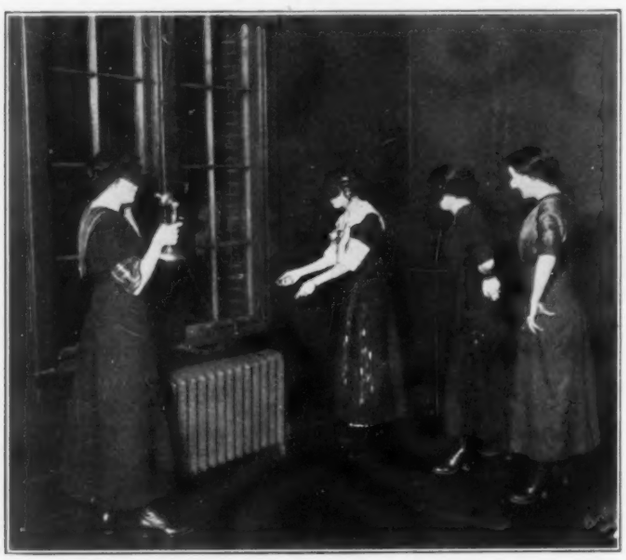
with solder and held parallel with the wires to be soldered. Thus the hands are kept well out of the way of any metal that may fall.

This iron can be used rather conveniently as a hammer also when a better hammer is not at hand.

Telephone Features at a Masked Ball

A NOVEL circulating telephone exchange operator was a feature of a masked ball recently given in Braddock, Pa., according to *Popular Electricity*. The young woman was equipped with a breast transmitter and head receiver, which were connected in series and terminated in a cord and two-conductor plug. She also carried in her hand, for the use of the other dancers, a Dean bull-neck type common battery desk set which also terminated in a two-conductor cord and plug. This type of desk set was used because of its lightness. A line was run into the hall and terminated in a strip of ten jacks. These jacks were multiplied so that, no matter which one you put the plug into, you would get the operator.

The equipment was furnished and installed by the



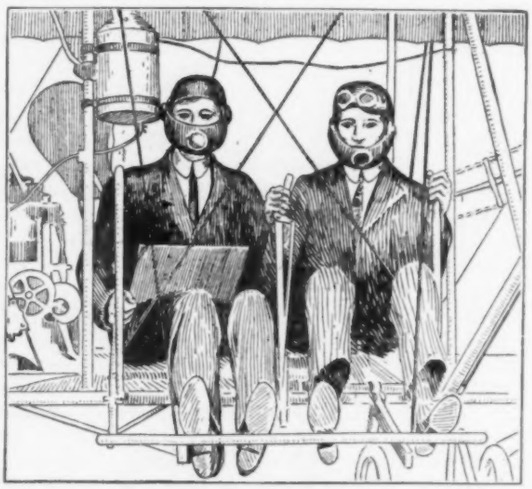
Circulating Telephone at a Masked Ball.

Pittsburgh & Allegheny Telephone Company. The participants in the affair were at first unconscious of the fact that actual telephone service would be given. When the discovery was made, dancers throughout the ball room were enabled to talk from the floor to friends in any part of the city—this service being free and unlimited.

Telephone Set for Airmen

THE accompanying illustration from *Popular Mechanics* shows Howard Gill and M. Bernays Johnson connected up by a special telephone apparatus and ready for a flight in a Wright biplane. Owing to the roar of machinery and the rushing air, conversation between pilot and passenger is exceptionally difficult without a telephone apparatus of some sort.

The apparatus here shown is particularly interesting because of the ingenious method of its mounting. Two receivers, made especially for the purpose, are mounted in the ear flaps of each cap or helmet in such position that they are held snugly and comfortably against the ears when these flaps are fastened under



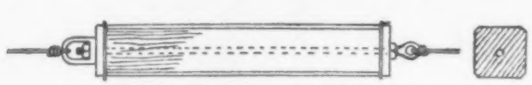
Howard Gill and M. Bernays Johnson Wearing Telephone Headgear Incorporated in the Ordinary Airman's Helmet.

the chin. Constructed to fit properly with the rest of the apparatus is a special light-weight transmitter which is held in place over the mouth by a band of soft leather, the ends of which are attached to the ear flaps. The batteries and speech-magnifying apparatus are contained in a box attached to the framework of the aeroplane. Communication is established by plugging the box with the flexible cords with which each helmet is provided.

The apparatus, it is expected, will also be used as part of the equipment for wireless communication with stations on the ground or with other aeroplanes. On one end of the box are two binding posts for connection with the receiving side of an aeroplane wireless set.

Cleaning Out Conduits

THE sketch illustrates a mandrel which I consider to be the best I have ever seen for cleaning out conduits, says George M. Peterson in *Popular Mechanics*. It is designed to be pulled through vitrified ducts to remove any stone, concrete or other obstruction which may have entered during the construction of the duct. For this reason the leather washers at each end should always fit the duct snugly and should be changed when worn, so that they will always have such a fit. If a pulling line of ⅜-inch stranded wire



Wood Block With End Washers.

is used, almost any obstruction which may have entered the duct can be removed. A line should be fastened to the rear end of the mandrel, as well as to the forward end. This allows for pulling the mandrel back and forth, when it is necessary to remove some obstruction by the "bumping" method.

The Dinnerless After-Dinner Speech

THE president of the United States, by virtue of his high office, is in great demand in every part of the country as an after-dinner speaker and must accept this fact as one of the penalties of greatness. While the demands upon his nervous system must be enormous, due to the strain incident to the preparation of speeches to fit the occasion, which may be a banquet of jewelers, dry goods merchants, patriotic societies, or what not, the demands upon his digestion must be infinitely worse. It was probably with a great feeling of relief that President Taft therefore welcomed the opportunity of delivering a talk to a dining-room full of banqueters without having to go through the ordeal of eating an extra dinner.

The Associated Press and American Newspaper Publishers, Association had arranged for a dinner to be held at the Waldorf-Astoria in New York on the evening of April 25 and, as has been their wont, extended an invitation to the president to partake of their hospitality and deliver one of his well directed talks. As it happened that Mr. Taft already had an engagement to deliver a political speech in Boston, it was manifestly impossible for him to be in New York. The president, however, has ever been a friend of the newspaper men and he did not care to let the occasion pass without a few words to the "newspaper cabinet." At this point the telephone made its appearance upon the scene and saved the day.

The American Telephone and Telegraph Company, in conjunction with the Western Electric Company, which manufactured and installed the apparatus, made arrangements which would enable the president to talk directly to the ear of each of the diners. When it is considered that provision had to be made for eight hundred and ten men, the difficulties become apparent. Nevertheless, they were solved. Seven trunk lines were brought in from Boston to the Cortlandt central office in New York, and two from Hot Springs, Va., to enable Premier Burden of Canada to say a few words, thence through seven Western Electric telephone repeaters to bring up the transmission and then over fourteen trunks to a special switchboard installed in the gallery of the banquet hall.

The table circuits were divided into branches, so that there would not be over 128 receivers on any one, and as each branch was in a "series-multiple" arrangement, tests were made before each speech as a rupture of one wire would have broken up the branch. A special and most successful feature was introduced whereby two microphones placed in the gallery of the hall conveyed the cheers and applause to the speaker.

The speeches of President Taft, who was in rare good humor, and of Premier Burden were heard with absolute distinctness. In fact, the successful carrying out of the plans may be regarded as a feat unparalleled in the history of the telephone art. Not only were more receivers in use than ever before, but the transmission obtained was better than it had been possible to obtain previously.

The vista of rest from dinners which the telephone opened for the president must have been gratifying to him.

Protecting Instruments Against Inductive Effects

IN laying long sections of cable, a system for a continuous insulation test from ship to shore during submersion has been in use for years. I was in charge of the shore end arrangements of all the cables laid by the French Company from Cuba to Brazil, relates Frank Fisher in *Telegraph and Telephone Age*. We used this system which proved very effective and was certainly very convenient, as I was in touch with the ship, through condenser and dead-beat mirror. The system is most simple. The shore end is joined to one plate of a condenser, thus being perfectly insulated; the other plate being joined to the coil of a dead-beat mirror, and to earth. Each change of polarity which

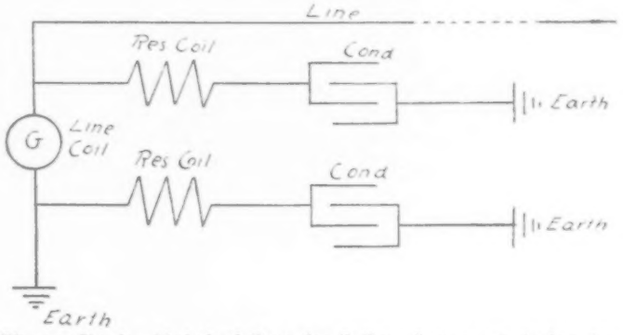


Diagram Showing Method of Protecting Delicate Instruments Against Inductive Effects.

took place aboard every fifteen minutes was noted by me on the mirror, its magnetic field being altered by the impulse from the condenser by induction. Whenever the ship desired to speak to shore they simply connected in circuit the ordinary sending key. Appreciating the value of such a perfect arrangement, some years later, when induction proved so fatal to duplex cable working I conceived the idea of reversing the intensity field and condenser and creating a leak in any conductor by a tap connection. This brought the intensity field to the same potential (+) as the conductor without in any way altering the resistance of the line, because whatever voltage was used for operating line had no outlet through this leak, as one

end of the coil was insulated. The coil, therefore, would take the same potential as the line, up to the point of insulation, and when joined to the condenser would remain so.

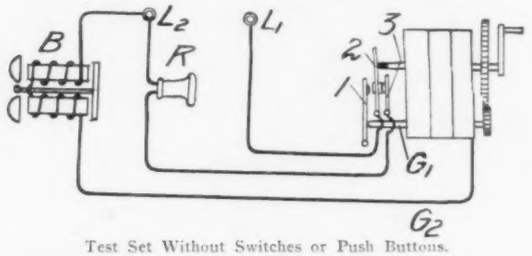
The action of the condenser convinced me that by connecting it to earth, the potential of which is (—), brought the line and earth to the same potential when induction ceases, thus placing the line coil in a neutral sphere.

Anticipating its value, I forthwith took out letters patent in the United States, France, England, Canada and Newfoundland, and patents are now pending in Germany.

In the accompanying diagram I merely show where and how the device is inserted. *G* is the magnetic field of whatever system may be worked, as the device is applicable to any and every system, siphon recorder mirror, telephone, Morse, etc., irrespective of their delicate magnetic fields. Its exceeding simplicity is its chief recommendation.

A Switchless Test Set

THE test telephone used by the repairman on a magneto exchange has a two point switch or a push button to switch first the magneto then the receiver on the line. This switch or push button is always causing more or less trouble by the connections



Test Set Without Switches or Push Buttons.

becoming loose and is not handy to use in very cold weather, says Claude B. Disbrow, Millington, Mich. To overcome the necessity of using a switch or push button wire the test telephone is shown. *1*, *2* and *3* are the shunt springs on the magneto; spring *1* makes contact with the tip on the end of the armature G_1, G_2 is connected to the frame of the magneto, *B* is a low resistance ringer, *R* is the receiver, and L_1, L_2 are the line terminals. Spring *2* is operated by turning the crank of the magneto. The ringer *B* will not ring on an open line circuit.

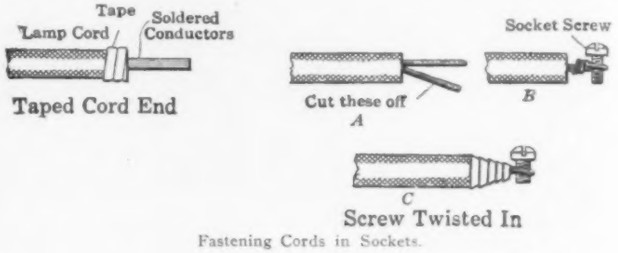
Wisconsin Commission News

Upon application of the Plymouth Telephone Exchange for permission to increase its rates, the Wisconsin Commission has decided that while an increase is necessary, it will not be authorized until the company has made such changes in its accounting system as may conform to the standards prescribed by the commission. Upon the adoption of such a system the company is authorized to enforce a schedule of rates devised by the commission which will mean an increase of about 50 per cent of the increase asked for. The present rates for single-party residence and business telephones are $1.10 and $1.75 per month, respectively and the rates petitioned for were $1.50 and $2.50, respectively.

The commission recently issued its first order under the state law requiring physical connection of telephone companies when it authorized the connection of the Cecil-Green Valley Telephone Company and the Linzy Brook Telephone Association. Connection would have been made voluntarily ere this had it not been for the fact that owing to certain contracts with the Wisconsin Telephone Company both companies would have been deprived of long distance connection; whereas, according to the decision of the commission, if the contracts are nullified by its action an order will be issued for their re-establishment.

Connecting Cords in Sockets

IN fastening cords in sockets some precaution should be taken to prevent stray strands of wire from coming in contact with metal and thereby causing short-

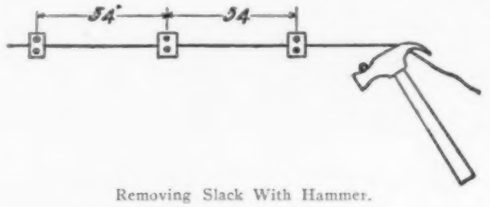


Fastening Cords in Sockets.

circuits or grounds, says C. Broadhurst in *Electrical World*. This can be accomplished by dipping the bared conductor of the cord in molten solder before it is made up under the binding screw. Strips of tape about ¼ inch wide, torn from wider pieces, are sometimes wound about the braid at the end of bared cord, to prevent the braid from unraveling. A fairly good method of fastening a cord in a socket is to cut half of the conductor away, twist the remaining strands into a little cable and then make it up about the screw. Tape should be applied as shown in the illustrations.

Taking Up Slack in Exposed Wiring

THE accompanying sketch contains a suggestion which may be of value to the wireman who is without a helper to pull the wires tight while installing cleat or knob-and-tube work, says Walter Hallst in the *Electrical Review*. I proceed in such a case by installing the cleats or knobs and placing the wires in



Removing Slack With Hammer.

them loosely, after which I drive a ten-penny nail at a point about six inches beyond the last cleat or knob, and use my hammer in the manner indicated to tighten the wire. I find that by this method I can get a wire as large as a No. 4 tight without harming the insulation.

Washington Commission News

The Public Service Commission of the state of Washington has issued an order in which it directs physical connection between the Benton County Independent Telephone Company at Olympia and the Sunnyside Telephone Company of Grandview, within thirty days from date, so that messages can be transferred between the patrons of both lines.

This order is the first of its kind, directing physical connection of telephone lines, since telephones were placed under the direction of the Public Service Commission, and therefore it is of great interest. The commission in its findings states that there is a contract existing between the Pacific Telephone and Telegraph Company and the Benton County Independent Telephone Company entered into October 1, 1909, which precluded the latter company from making physical connection with the Sunnyside company, but the commission says in its order that the connection is desired as a public necessity and must therefore be made. Joint rates and charges for the double service will be put forward shortly. The commission in concluding says it "does not undertake to pass or adjudicate the contract relations nor the rights of both companies under the contract," but finds "that the public necessity and interest are superior and paramount and demand and require the said connection at Grandview."

The commission has also ordered the Pacific Telephone and Telegraph Company, which operates most of the long distance lines in the state, to make connection with the Sunnyside company for through service. The former company already has contracts with exclusive traffic provisions with the Yakima Valley Telephone Company which operates in territory coincident with the Sunnyside Telephone Company.

The schedules filed by the Pacific company for increase of toll rates between Seattle and Tacoma have been suspended, the commission requiring the company to show the reasonableness and merits of the new schedules.

Maryland Commission News

In January last an order was issued by the Maryland Commission by which it abolished the flat rate for business telephones and subscribers of this class were placed on a measured basis. In preparing the schedule provision was made for two rates for large users of telephones, schedule B, the minimum rate for which was 5,400 calls at $147 a year and additional calls at the rate of three cents each; and schedule E, the private branch exchange rate, which calls for a switchboard with operator's set, two trunk lines and 3,900 local messages for $258 per year, with additional local messages at three cents each or two cents each when contracted for in blocks of 900. It was held by the company that in order to get the benefit of these rates it would be necessary for the subscriber to decide how many calls he would need at the time of making the contract and contract for them at that time; that in case he found before the end of his contract year that he would need more calls, he could either use additional calls at three cents each or make a new contract, but that he could not contract for additional blocks of calls at the minimum rate without a new contract.

As a result of this ruling many complaints were made to the commission, and the latter has just issued a supplementary order in which it more clearly explains its intention as to certain rates for business and residence service, stating that it had no other idea than that the right to purchase additional calls in blocks of 600 and 900 might be exercised at any time and that the matter must be settled in accordance with the commission's understanding of its order. Complaints were also received regarding schedule B, residence service, which is identical with schedule F of the business service, the rate being 30 calls a month at a charge of $2. The company held that although the contracts were annual, they did not call for 360 calls a year and the calls were not cumulative; that the unused calls in one month would not offset the extra ones in the next month, but in each case the subscriber would have to pay the $2 and five cents each for additional calls. The commission also held this interpretation was contrary to its order as it was intended that the calls should be cumulative, and that while in making monthly settlements the subscriber might be required to pay $2 a month with five cents each for any calls over thirty in any one month, at the end of the year there would have to be an adjustment on the basis of 360 calls a year and five cents for extra calls, making refund when necessary.

The Chesapeake and Potomac Telephone Company has applied to the Maryland Commission for permission to take over that part of the Diamond State Telephone Company which operates in Delaware and the eastern counties of Maryland and Virginia, for which the company agrees to pay the sum of $515,580.88, subject to a $500,000 mortgage given by the Diamond State Company to the West End Trust Company as trustee. It is provided that each party to the agreement shall pay half of the principal amount when the mortgage becomes due, and each in the meantime shall pay half the total interest charges. June 13 has been set for a hearing of the case.

Three Cent Coins Not to Resemble Nickels

Telephone and street railway companies all over the United States have opened fire on the bill providing for the coinage of three cent and half cent pieces. Many senators have received letters from these interests asking their opposition to the bill which already has passed the house and is pending before the senate finance committee. The telephone companies express fear that a three cent piece might be used instead of a dime in their slot machine telephones. This fear is ungrounded.

The first thing that the Director of the Mint, George H. Roberts did after the proposed legislation was submitted to him for opinion, was to urge that the language of the bill be so shaped that the treasury could make the coin wholly unlike, in size and design, any existing coin. The design now most favored by the treasury is much too large to enter a dime slot, too small to operate a nickel slot and possesses a scalloped edge like an Indian one anna piece. The interests of the slot machine concerns have been borne in mind from the first.

Friends of the proposed restoration of the three cent piece to the currency believe the opposition is based more on the fear that its existence will tend to promote sentiment for three cent car fares and telephone calls. Representative Bulkley, of Ohio, who introduced the house bill, and Senator Pomerene, who is working for the reform in the senate, both urge that it will be a great convenience in those Ohio cities where three cent fares prevail.

Motor Trucks in Telephone Work

Some Specific Examples

From the *Motor World.*

IT may seem inconceivable to the average man in the street that the replacement of horse-drawn vehicles with 48 motor trucks, 43 of them being gasolene, of which 10 are of 800 pounds capacity, and the other 5 are electric, could be directly responsible for a net annual saving in operating expense of $72,000. And yet, startling as the figure may seem, this enormous saving has been effected and still is being effected by the New York Telephone Company—in fact and not in fancy.

System and organization are the backbone of every business of magnitude and it is doubtful if any business is run under more economical conditions than that of the truly immense New York Telephone Company; it exhibits a nicety of adjustment and a smoothness of operation that can only be obtained with the aid of the oil of real efficiency. It requires that the latest and most up-to-date methods and machinery be employed—any paying business does, for that matter—and after all it may not be so surprising that operating costs have been so materially reduced during the past few years with the help of motor trucks.

Old Way of Erecting Telephone Poles.

But just as has been found in hundreds of other cases, so it has been found in the case of the New York Telephone Company: The motor truck may not be used indiscriminately if ultimate efficiency is to be advanced. It has its sphere of usefulness and it gradually is being increased in size. But it cannot hope to compete with horse-drawn vehicles in economy of operation under certain conditions. In some cases the motor truck has completely ousted the horsed vehicle, but in other cases it has not and it is doubtful if it will for quite a long time to come.

Consequently, despite the enormous saving of some $72,000 which is effected with the help of 48 motor trucks—there still remain 5 more trucks, 14 touring cars and 97 runabouts to be accounted for, and though the total saving is not divulged it would seem $72,000 is a modest figure—the company continues to make annual outlay of some $385,000 for the hire of horsed vehicles; they are used where the employment of motor trucks would cause a deficit instead of a saving.

Such are the facts and figures as compiled by A. W. Allen, who is the superintendent of buildings and supplies for the New York Telephone Company, and they cover a period of 11 years. He tells, in the *Telephone Review*, which is the house organ of the company, of the first experiments which were made with motor trucks and the experience of the company from 1901 up to date, and it is seldom that a more interesting statement of operating experience makes its appearance in print:

How Cable Is Hauled Underground.

Back in 1901, when the New York Telephone Company's field of operation comprised Manhattan, The Bronx and Westchester, the construction department put in service the first motor vehicle owned by the company. This was an electric, manufactured by the Vehicle Equipment Company, of 10,000 pounds capacity, equipped with two 1¾ horsepower motors for propelling the truck, taking current from a lead battery and another motor of two horsepower taking current from the same battery for operating a "nigger head"

used for pulling cable into the subway. This was before the time of extensive aerial cable construction work, so that in the design of the pulling device, only the conditions met with in underground work had to be considered. This truck remained in service until 1907.

From 1905 to 1909, three more electrics were purchased; two of 2,000 pounds capacity and one of 3,000 pounds capacity. These were of the Lansden make, equipped with Edison batteries. All three of these trucks are still in the delivery service of the repair shop.

In 1907, the construction department in New York put in service the first gas truck owned by the company. This was a Hewitt of 10,000 pounds capacity and equipped with a Higbie hoisting winch geared to the truck engine. This truck has a splendid record and is still in service.

The developments and economies resulting from the use of the Hewitt truck in Manhattan, The Bronx and Westchester, in both underground and aerial cable work, created a demand for motor trucks throughout the company's territory which at this time included the old New York company operating in Manhattan, The Bronx and Westchester, and part of Connecticut, and the merged companies operating throughout the remainder of the State of New York, and a part of the State of New Jersey. This demand was due largely to changes in outside construction methods involving a more general use of aerial cable. The amount of this work under way and contemplated made it apparent that a limited number of trucks equipped with power winches could be kept continually busy for a number of years. In the fall of 1910, a careful study was made to determine the number of motor trucks required in each plant division, considering only their installation where continual use and a saving in man labor would insure greatest economy. This study led into a consideration of motor vehicles, not only for cable construction, but for all other lines of telephone development and maintenance work.

Modern Way of Performing Same Work.

The transportation problem of the telephone company is made up of a number of fairly distinct elements:

a. The transporting of heavy construction material.

b. The use of a truck equipped with a power winch as a tool in erecting poles and placing lead covered cable in the plant.

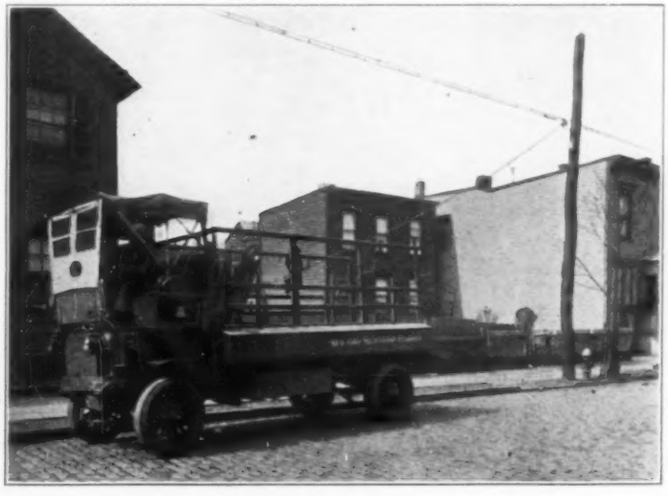
c. The transporting of loop gangs with their tools and equipments.

d. The delivery of splicers' supplies.

e. The delivery of subscribers' station apparatus.

f. The distribution of repaired material from the shop.

Over a period of several months, records were maintained of loads carried by horse-drawn trucks both in underground and aerial cable work (classes *a* and *b*). These records showed that the average load was about 5,000 pounds, although in a number of cases 8,000 pounds were carried, and in other cases, two trips of a horse-drawn truck were necessary where one trip of a large capacity motor truck would have proven more economical. These cases however, were infrequent enough to show that on the average a truck to meet the maximum condition would go out loaded to about half its capacity, and the cost of maintenance, as against a truck which would more nearly meet the average condition, was so much higher as to entirely offset this saving in carrying the occasional heavy load. It was, therefore, decided that a truck of 6,000 pounds capacity would best meet requirements, and that it must be equipped with a power winch and a strongly built body of special design.



Method of Hanging Overhead Cables.

In the study of loop work (classes *c*, *d* and *e*) the requirements were radically different from those met with in a consideration of construction work. The trucks would be used in the delivery of subscribers' equipment and splic-

er's supplies, and in the transportation of loop gangs with their tools and equipment. No winch was required in this service, and the economy in transporting heavy loads was offset by the larger economy to be obtained through

STATEMENT "A."

Comparison of Motor Vehicles with Horse-Drawn Vehicles.

Detail of Operating Expense and Saving made by Three-ton Trucks Used by Cable Placing Dept.

Annual Operating Expense, Three-Ton Mack Truck Based on Performance of 10 Trucks, Average 10,900 Miles.		Approximate Gross Annual Saving on Horse-Drawn Vehicles Replaced by Three-Ton Mack Truck Based on 7 Months' Usage.	
Chauffeur's salary (full time, including overtime)	$1,146.50	Truck Hire (Aug. to Feb.)	$2,904.20
Garage and washing	240.00	Carfare (Aug. to Feb.)	361.69
Gasolene (.0365 per mile)	397.85	Freight (Aug. to Feb.)	118.00
Lubricants (.0171 per mile)	186.39		
Tires (.055 per mile)	599.50	Total 7 months	$3,383.89
Supplies (miscellaneous)	54.50		
Repairs	240.00	Approximated annual saving	$5,800.00
Depreciation, interest and taxes	1,020.50	Approximated annual saving by placing cable	500.00
Total	$3,885.24	Total	$6,300.00
Approximated gross annual saving by three-ton Mack Truck			$6,300.00
Annual operating expense of three-ton Mack Truck			3,885.24
Net annual saving per truck			$2,414.76

the greater speed of a truck of small capacity. It was very much more difficult to determine the proper carrying capacity for this service, because in suburban territory, the truck in addition to transporting the gang would be required to carry subscribers' equipment, wire, miscellaneous material and tools, the weights of the load varying with the outside plant facilities at point of installation and the number of installations to be made in one day.

Again, in city work, where block and house cable facilities are provided in advance, the only material to be delivered by truck is subscribers' equipment and inside wire. The chauffeur operating the truck would be required to make the delivery. In this work the congested traffic conditions precluded the possibility of high mileage, and the nearness to the base of supplies made it unnecessary to consider a truck of greater capacity than was required for one day's deliveries.

In the delivery of splicers' supplies to the man on the job, the size of the truck to be used as between one of 2,000 pounds and 4,000 pounds is problematical depending largely on the number of men to be served, the radius

STATEMENT "B."

Comparison of Motor Vehicles with Horse-Drawn Vehicles.

Detail of Operating Expense and Saving Made by Three-Ton Trucks Used by the Heavy Aerial Construction Gangs.

Annual Operating Expense Three-Ton Mack Truck Based on Performance of 7 Trucks, Average 5,310 Miles.		Approximated Gross Annual Saving on Horse-Drawn Vehicles Replaced by Three-Ton Mack Truck.	
*Chauffeur's salary (part time)	$ 360.00	Teams for hauling men, tools, etc.	$1,450.00
Garage and washing	240.00	Placing cable	350.00
Gasolene (.0625 per mile)	331.87	Extra truck for hauling poles	150.00
Lubricants (.0325 per mile)	172.57	Extra truck for hauling cable	300.00
Tires (.055 per mile)	292.05	Traveling time of men	1,200.00
Supplies (miscellaneous)	54.50	Labor setting poles	300.00
Repairs	120.00		
Depreciation, Interest and Taxes	750.00	Total for year	$3,750.00
Total	$2,320.99		
Approximated gross annual saving by three-ton Mack Truck			$3,750.00
Annual operating expense of three-ton Mack Truck			2,320.99
Net annual saving per truck			$1,429.01

*The chauffeurs operating these trucks are experienced linemen and work with the gang when trucks are standing idle; hence part of their expense is properly chargeable to the work.

offices in Manhattan, the Bronx and Westchester. With the merging of the New York and New Jersey Telephone Company, taking in Long Island and a part of the state of New Jersey, it was found more economical to close the shops which were maintained in Brooklyn and Newark and serve the entire territory from the shop in Manhattan.

This wiser field of operation necessarily changed entirely the method of shop deliveries. The Lansdens had proven very satisfactory in the congested sections of Manhattan, but their limited daily mileage and speed made it uneconomical to send them on the longer hauls into Long Island and New Jersey. Study indicated that the operations of electric should be confined to the downtown sections of Manhattan and Brooklyn; that 2,000-pound gas trucks should be used for longer hauls where daily deliveries were required; and 4,000 to 6,000-pound gas trucks for the longer hauls where tri-weekly service would meet the plant requirements.

After determining the requirements for all of the trucking conditions intended to be considered at that time, orders were placed with the Mack company for:

17 trucks of 6,000 pounds capacity, equipped with power winches,
1 truck of 4,000 to 6,000 pounds capacity, and
15 trucks of 2,000 pounds capacity.

Later an order was placed with the Ford company for 10 800-pound delivery wagons.

of operation, the distance from the supply base and the weight of load for one day's deliveries.

A final analysis of this service indicated that for classes *c* and *d*, a truck of 2,000 pounds capacity would meet the average condition and that for class *e* a truck of 800 pounds capacity should be used.

It proved less difficult to determine the repair shop's

All of the trucks other than the 6,000-pound type were to be of standard design. The 6,000-pound trucks were to be equipped with power winches and body of special design. These bodies were to be of two types, one arranged with locker compartments extending over the wheels outside of the loading space which was narrowed down to 5 feet; the other with all of the available space in the clear giving a loading platform 6 feet wide by 13 feet long. The winch specification required two speeds, one of from 20 to 40 feet per minute for loading and unloading heavy reels; and another from 40 feet to 175 feet per minute for pulling in underground and aerial cable. The construction of the winch mechanism must be such as to permit of reverse, in order that at the completion of a cable pull, while tension is still on the pulling line, the drum may be released to allow of the removal of the cable grip.

The manufacturer met all of these conditions by taking advantage of the internal clutch type of sliding gear transmission. Another lever was provided in addition to those used for operating the truck, so that with the transmission in neutral, the operation of this lever would prevent the clutch from engaging the pinion driving through the bevel gears. The intermediate and low speeds and reverse of the transmission could then be applied to the winch through the transmission to a worm driven jack shaft under the winch, thence by chain drive to the winch drum.

The use of the 6,000-pound winch truck is peculiar to the telephone business in that the actual trucking problem is complicated through the necessity of adapting the truck to hauling of supplies, and when destination is reached, the utilization on the job as a tool in the hands of the plant workmen. The power winch makes it comparatively easy to place a reel of cable 6½ feet in diameter and weighing 2½ tons, on the truck. When the reel is transported to the job, the winch is again used in pulling the cable into the subway or aerial rings. The first saving involved is one of labor in loading; the second, the greater speed of the power truck in getting to destination; and the third, a saving of labor in finally placing cable in the plant.

A very interesting comparison may be drawn between the truck used continually in extensive aerial or underground construction work, and the truck assigned to a definite area within which it will be used for handling the construction jobs and the repairs and replacements incident to the upkeep of old plant.

In the first case take the actual records of the work done by a 6,000-pound winch truck in delivering and placing in the plant 35,391 feet 300-pair No. 19-gauge and 600-pair No. 22-gauge underground cable:

Delivery from freight station to job:
79 reels—total weight 153½ tons.
Number of miles traveled—190.
Cost of delivery per ton—$0.84.
Pulling into the subway:
Number of sections—95.
Average number of sections pulled per day—12.
Average number of feet pulled per day—4,464.
*Average winch cost per foot—$.00275.
Returning empty reels to freight station:
79 empty reels returned.
Number of miles traveled—90.
Average cost per reel—$0.93.

A number of trucks are used continually in the service as outlined above. The average mileage of such trucks is approximately 11,000 miles per year; that is, the truck is used as a truck more than 50 per cent of the time, and the saving involved is largely in the cost of trucking as compared to a horse-drawn truck. STATEMENT A gives the estimated yearly operating cost and saving based on actual records of seven months' use.

In the second case cited, the truck covers approximately 5,300 miles per year, or to express it in different terms, in a working day of nine hours, it is traveling only 22 per cent of the time. In the territory where such trucks are used, transportation facilities are relatively poor, so that there is a decided economy in having the gang report at headquarters where the truck is to be loaded in the morning, and ride with the truck to the job. Such trucks may cover anywhere from one to five jobs in a day, the men in every case traveling from job to job with the truck.

The truck is utilized on the job pulling in cable, starting and setting poles, and necessarily stands idle more of the time than in the first case cited, as it acts more as a utility tool in the hands of the workmen, than as a truck.

STATEMENT B estimates the total cost of operation for such a truck over a period of a year and the estimated saving based on actual daily records maintained over a period of about seven months.

In STATEMENT A depreciation is based on a 5-year life. In STATEMENT B depreciation is conservatively based on an 8-year life. It is clear from a study of the statements, that because of the smaller mileage, it would be fair to assume that depreciation should be nearer 10 per cent per year than 12½ per cent as is figured.

*This figure includes all fixed charges on the truck. To be more exact, we should eliminate depreciation on body and frame and tire charges, as the winch is used while the truck is standing idle.

STATEMENT "C."
Comparison of Motor Vehicles with Horse-Drawn Vehicles.
Detail of Operating Expense and Saving Made by One-Ton Truck Used to Supply Material to Splicers.

Annual Operating Expense One-Ton Mack Truck Based on Performance of 15 Trucks, Average 10,300 Miles.

Chauffeur's salary (including full time and overtime)	$ 864.00
Garage and washing	216.00
Gasolene (.018 per mile)	185.40
Lubricants (0.008 per mile)	82.40
Tires (.026 per mile)	309.00
Supplies (miscellaneous)	52.50
Repairs	150.00
Depreciation, interest and taxes	599.00
Team hire on account of truck	236.00
Total	$2,694.30

Approximated Gross Annual Saving on Horse-Drawn Vehicles Replaced by One-Ton Mack Truck in the New Jersey Division.

Newark, Material Wagon per day	$	5.25
Orange, Material Wagon per day		5.00
Clerk on Newark Wagon per day		2.00
Clerk on Orange Wagon per day		2.00
Total per day	$	14.25
Total per year, 290 days		$4,132.50
Additional truck hire for special work		30.00
Total		$4,162.50

		$4,162.50
Approximated gross annual saving by one-ton Mack truck	$2,458.30	
Annual operating expense one-ton Mack truck	236.00	2,694.30
Team hire		
Net annual saving		$1,468.20

In the case first cited, it is very easy to determine whether or not the installation of a power truck will effect economies. In the second case cited, territorial and operating conditions must be studied more carefully; otherwise, a power truck which is apparently doing good work may be costing more than a horse-drawn truck.

Studies made along these lines in a large percentage of the cases show that the use of the power truck proves more expensive than the use of the horse-drawn truck.

One of the most interesting developments which have followed the use of the winch truck has been the installation of a derrick for setting poles. Whereas the old method required from six to eight men, and a time element of from 10 to 20 minutes, per pole, the new method requires the services of only two men to hold the butt of the pole in position, while the chauffeur operates the winch in lifting the pole and dropping it into the hole; the time element in this case being from 2 to 5 minutes, or in other words, the cost of setting the pole is practically eliminated.

A satisfactory hole digger to be used in conjunction with this pole derrick is one of the anticipated developments which will materially reduce the expense of building pole lines.

In parts of the company's territory, where it has extensive underground plant, the 6,000-pound truck is used for delivering and pulling in underground cable. After this has been accomplished, the splicing forces are employed in connecting up section lengths and cutting cable into service. The 2,000-pound truck is used as a traveling storeroom, going from job to job, furnishing each splicer with tools, solder, paraffine, lead sleeving or other supplies as may be required for carrying on the work. This service has effected a considerable saving over the horse wagon delivery.

Statement C shows the average operating cost of the 2,000-pound truck. The gross effected represents the actual amount of money expended for hired wagons and clerical labor prior to our purchase of power trucks.

The company is not prepared, at this time, to furnish detailed figures on the saving effected through the use of the 2,000-pound truck in aerial loop work. In fact, it has not in any case replaced horse trucks where the entire time of a power truck would be required. It is using eleven 2,000-pound power trucks, where part time is given to loop work and part time to the delivery of pole line hardware, wire and miscellaneous material, used in the aerial plant; in every instance these trucks have been installed where there was no doubt as to the saving to be effected. In the Long Island division, where two 2,000-pound trucks replaced four horse-drawn trucks in handling this combination work, a net saving, in truck hire and labor combined, of $2,900 per year was effected.

Prior to the time when a satisfactory motor wagon could be secured at a reasonable cost, the most economical plan of handling subscribers' installations was to have the installer carry with him to the job the apparatus to be used. This necessitated the workman reporting at the storeroom each morning to get his equipment and returning there during the day as apparatus was required for other installations. It is quite apparent that, in handling installations in this manner, much time was lost by workmen in traveling from storeroom to the job and returning to the storeroom when additional material was needed during the day.

By relieving the installer of carrying material, or by reducing the time required in this particular phase of the work, more of his time could be applied to the actual installation. This result had been partially accomplished in the past through having six retail storerooms on Manhattan Island—the installation forces operating by districts, with the nearest storeroom as district headquarters.

In utilizing power wagons for delivering equipment directly to the subscriber's address, the first economy effected is through cutting down the installer's traveling time, as, instead of reporting to the storeroom in the morning, he reports directly to the subscriber's address where the installation is to be made. The second economy is effected through closing the six retail storerooms and making deliveries from one central point, and by this centralization reducing the supply investment. The third economy is the result of operating a centralized minor repair shop in conjunction with the storeroom. When six storerooms were operated, it was necessary to make minor repairs to apparatus recovered within each of the six storerooms. With centralization, the volume of repairs at once became great enough to prove in piece work, thus effecting an economy in actual repairs, and a further economy in that work could be supervised by one foreman instead of the six required to operate the smaller repair shops under the district system. This centralization naturally brought about a considerable saving in clerical routine also.

Lincoln Company Refuses Interconnection

Compulsory physical connection of telephone exchanges, once considered a desirable idea, is not now favored by the Lincoln Telephone & Telegraph Company, which recently absorbed the holdings of the Bell in a large area of southern Nebraska. In a pleading filed with the State Railway Commission, the company denies the right of that tribunal to order a connection between its own lines and those of the Hastings Telephone Company, as prayed for by the latter.

The Hastings company brought a complaint before the railway commission some time ago, alleging that since the merger of the Nebraska Bell with the Lincoln Telephone & Telegraph Company the long distance service formerly afforded to the complaining corporation has been partially cut off, and that discrimination in rates is being practiced against it by the Lincoln company, which is its competitor in the local field at Hastings.

In its filing the Lincoln company presents blanket objections to any hearing of the complaint from Hastings, or any inquiry whatever into the matters set forth in the Hasting's company's petition. It contends that the railway commission has no jurisdiction to hear the case or to order any physical connection of the two companies' lines.

To fortify these assertions, it makes use of the doctrine propounded by Judge Sanborn in his decision knocking out the two cent fare law of Minnesota, which was that the rate fixed by the state legislature interferes with interstate commerce and is therefore unconstitutional.

It is stated in the Lincoln company's answer that its lines are engaged in carrying interstate commerce, and that they are operated in conjunction with toll lines owned or controlled by various other telephone and telegraph companies engaged in interstate commerce. Any order by the railway commission in the pending case, the answer says, will disturb and interfere with telephone traffic between states. Hence the company maintains, the commission has no authority to make the investigation.

Digest of Foreign Telephone Literature

Translated for Our Readers

IMPROVING MENTALITY BY ELECTRICITY.

THE Swedish physicist, Svante Arrhenius, has completed extensive experiments at Stockholm, in which he tried to establish the relation between electricity and mentality. His hypothesis was that the electric current had a certain influence upon the human organism, and he tested this theory by subjecting pupils and teachers of a public school to experiments. He selected 100 pupils of average capacity and separated them into two groups of 50 each, taking care to obtain as great a degree of uniformity as possible as regards health, age, mental capacity, etc. Each of these groups was assigned one room. One of the rooms was wired with high-tension wires, well insulated and placed above the ceiling, beneath the floor and behind the walls. The fifty pupils who studied within this high tension cage were always surrounded by a powerful magnetic influence. The other fifty pupils worked on the same problems, but in a room not exposed to the electric influence. Neither pupils nor teachers were aware of the presence of the electric installations. After the experiment had been carried on six months it was found that the pupils in the electric room had grown on the average by 51 mm (2.04 in.), while the children in the other room only averaged 32 mm (1.28 in.). The same relation was true in their mental faculties. Taking the standard of 20 as perfection, it was found that the pupils of the electric class obtained average results as high as 18.4, fifteen of them obtaining 20, while the averages of the non-electric class pupils were below 15, with only 9 at the 20 mark. The teachers of the electric class reported that their resistance against fatigue had increased tremendously during the length of the test.—*De Ingeineur.*

PUBLIC TELEPHONES IN BERLIN.

The Berlin authorities have decided to install public telephone stations, to be open day and night. They expect to build special kiosks or booths at various important points and install telephones, so that the latter can be used at all times. These booths are to be of considerable size and have space for the posting of municipal notices. It is thought that reinforced concrete will be used for these kiosks, and that each of them will be provided with a clock giving the standard time.

THE TELEPHONE AS A DISEASE CARRIER.

The result of investigations were recently published showing the part played by the telephone transmitter in carrying disease germs. A large number of receivers were taken from public stations, restaurants, railroads, hotels, etc., washed, and guinea pigs inoculated with the solutions. If the transmitters contained disease germs, especially those of tuberculosis, the results would show on the pigs. The latter did not catch the disease. To be doubly certain, the transmitter mouthpiece from tuberculosis hospitals were obtained, and especially those mouthpieces used exclusively by the patients, and similar tests were made. These mouthpieces had not been disinfested during the entire year and would certainly have transferred the tubercle germs to the guinea pigs, had any been present. The absence of any indication of disease on these pigs points to the opinion that the telephone transmitter is not a disease carrier.—*Zeit f. Schwachstromtch.*

TELEPHONY THROUGH EARTH.

To test the possibility of the earth for telephone service experiments were made in which a microphone was used as a transmitter, along with a battery and a coil of heavy wire with iron core, in series, from which wires ran to two electrodes buried in the ground at a distance of 30 feet apart. At the receiving station a similar system was used. Increasing the distance between electrodes and strengthening the batteries increases the distance of communication. The nature of the ground has no influence on the communication, and it was possible to establish connections on land, on water, and also in coal mines. In the last experiments the sending station was on a motor-boat, the receiving station on a cliff about 1½ miles away, and communication was excellent.—*Jahr. f. drahtl. Tel.*

A UNIQUE TELEPHONE SCHOOL.

The Parisian organ for French humor and sarcasm, *Figaro,* gives a short account of a new telephone school, which may be taken at its face value:

Monsieur Chaumet, our kind secretary of state, and manager of the post office and telephone system, has informed us of the opening of his new telephone school, in which the operators receive the final touches in their education. A teacher in this new school gave the following account of its curriculum:

"Our school," he said, "will be opened in a few days, and will give opportunities to its students to obtain the highest positions after graduation. The courses will take six weeks, and increase in difficulty each week. The first week the pupils are taught to observe silence. Closed up in a special booth, receiver to ear, they are taught never to answer. On the other end of the wire the teacher yells a subscriber's number into the telephone, and the pupil concentrates all his energies not to pay any attention to these calls. Ten days of such service will probably suffice to harden the pupil and cause a state of carelessness bordering on contempt, which is necessary for such delicate work. The next course teaches the pupil how to interrupt a conversation and cut off the lines without any reason. After graduating from this class the student joins the indiscretion class. Here he learns the art of listening to the private conservation of subscribers without being caught at the game. Finally he is taught elocution. In a large, noisy hall he is taught to yell insults, curses and vituperations at those subscribers who should have the impudence to lodge a complaint against such service."

"That is wonderful and admirable," said the reporter.

"Not at all," answered the instructor," "here is something even more wonderful." Do you see this telephone? Well, this is an entirely new instrument, which the company intends to supply to all of its subscribers. This is the telephone with which one could speak over long distances, but unfortunately no one has ever been able to make it work in the slightest degree."—*Zeit. f. Schwachstrom.*

A NEW STORAGE BATTERY.

Prof. Hannover of Copenhagen is said to have invented a new type of storage battery which uses porous metals, especially lead, as an agent. This battery has only one-fourth or one-fifth of the weight of the usual

lead storage battery. The present method of lead storage battery manufacture seems to have given the least possible weight under normal conditions, and it seems hardly possible that the mass of the battery can be reduced to the limits claimed by Prof. Hannover. This is, moreover, excluded according to Faraday's laws of electrochemical equivalents. This law has been tested again and again and is the basis of all electrochemistry. According to this law and according to the equation recognized as proper for the discharge of the lead storage battery we have:

$$PbO_2 + Pb + 2H_2SO_4 = 2PbSO_4 + 2H_2O$$

We can therefore figure out the necessary quantity of lead used by the battery when giving one ampere-hour. We have 3.85 g. lead, 4.46 g. peroxide of lead and 3.66 g. sulphuric acid. As the latter cannot be used in a concentrated state, it has to be diluted with at least 1.5 times its volume of water, so that we must add 5.5 g. water. We have then a reacting mass of 17.47 g. when the battery gives off one ampere hour. If we take the discharge voltage at 2 volts, a very favorable state, we would get about 8.735 g. per watt hour. This quantity of reagents is absolutely necessary by theory. 1 kg. of these substances could, therefore, yield only 115 watt hours. These theoretically correct quantities are, however, insufficient in practice, since the lead sulphate, the final product, is a non-conductor, and since we must have a reserve energy in the lead plates in order to have a certain conductivity of the active agents at the end of the discharge. It is just as true that the quantity of sulphuric acid mentioned before is insufficient, since all of this is needed to form the lead sulphate. We must, therefore, have an excess of sulphuric acid to retain enough electrical conductivity at the end of the discharge, so that the practical minimum value for the reacting substances would be equal to 26.2 g. ampere hours and 13.1 g. watt-hour, so that we would have 77 watt-hours for 1 kg. In addition we need hard rubber or celluloid vessels, connections between lead plates, and other details, all of which add to the weight of the battery. The minimum limit for the weight of a good lead storage battery is therefore 20 g. watt-hour, giving a capacity of 50 watt-hours kg. for the battery element. Such an element would probably have a short life. It is hardly conceivable in view of these facts that the new element should have a capacity of 120-175 watt-hours-kg. with a smaller total weight. It may be, however, that a very porous lead was used with very light material for the rest of the battery, and that the battery may give good results after further experiments and may be of service in telephone exchanges. The details of the metallic mass are still kept in darkness, but the plates are said to be 4—5 cm. (1.6-2.0 inches) long and wide, 1.6 cm. (.64 inches) thick and to consist of a very light lead frame filled with the new porous metallic substance. —*Elek. Zeit.*

THE USE OF PRIMARY CELLS FOR EXCHANGES.

The primary battery used up to a few years ago by the German imperial post and telephone department has gradually given way to the storage battery. Of the wet cells only the copper cell (Meidinger) is used, and the carbon (Leclanche cell) has been abolished and has been replaced by dry batteries. The latter have given excellent results as microphone cells, and are very economical, since they usually have a life of 2½ to 3 years and cost about 40 cents on an average. The department has tested about 186 different types of elements, of which only few were found to be satisfactory. The annual expense for dry batteries for a telephone exchange using this source of power has been reduced from 45 cents per cell to 21 cents, with longer life of the batteries, since they are now placed in parallel, and not in series as was done in former years. The department has established the following standards for its primary cells and dry batteries: The e. m. f. must not be below 1.5 volt and the interior resistance within new cells must not exceed 0.1 ohm. The terminal voltage must be at least 1.45 volt when the cells are connected and have a resistance of 10 ohms. The cells must have the power of self-regeneration. Those cells are declared useless whose terminal voltage drops below 0.7 volts, when the batteries are connected for 2 minutes, at a resistance of 10 ohms. Such cells, although useless for the microphone, can be used to advantage for call batteries. If they are useless for this work, they are taken apart and the constituents are sold. The zinc electrodes are cleaned and melted into plates, which are used for the production of zinc rings for other cells. The zinc not used in this way, amounting to 22,000 pounds in one year, is sold.—*Archiv f. Post u. Tel.*

RECENT ADVANCES IN WIRELESS TELEPHONY.

Much attention has been paid within recent years to wireless telegraphy and telephony, although the latter has been investigated to a smaller degree than the telegraph system. In a recent meeting of the Swiss electrical society, Dr. Eichhorn made an address giving a brief review of the wireless telegraph and telephone system, and the following abstract gives his resumé of the progress made in wireless telephony.

In mentioning the connection between wireless telegraphy and telephony he calls special attention to the Rein-Lorenz system, where a thermoelectric cell is used as receiving apparatus. The distances to be covered by this system depend to a large extent upon the antennae and the current strength in the same. Using an antenna of about 60 feet height with a fundamental oscillation of 660 feet it was possible to cover a distance of 30 miles. The current strength in the aerial system was about 2.6 amperes, with 1.8 ampere primary current. Using the same primary current, but a larger antenna of 1,800 feet fundamental oscillation, it was possible to cover a distance of 120 miles without any trouble.

The advantages of this system lie in the fact that with the use of a single wave antenna radiation, changing only the self induction or the capacity of the antenna, a change in the length of sound wave is easily obtained, and with it a greater variation in acoustic qualities. The fact that with this system any number of tones can be produced is another advantage, since with the employment of mono-telephones the receiving of one single quality of sound is safeguarded. It might be added that this system with its regulated impulse discharges permits its use with wireless telephony. Of the two methods originally proposed for wireless telephony, namely to change the amplitude or the wave lengths of the electromagnetic changes in accordance with the rhythm of the spoken words by means of the microphone, only the change of the amplitudes seems to promise any satisfactory results. The change in the length of sound waves would mean a dissonance in the receiving apparatus and would have a bad effect on the quality of transmission of sound waves. The change in the amplitude is most effective when the resistance of the antenna radiation is equal to the microphone arrangement. According to the load, the resistance of the necessary carbon grain microphones will vary between 4 to 10 ohms. If

the antenna system has the same resistance, it would be best to connect the microphone into the same series with the antenna. If the resistance of the antenna radiation is greater, several michrophones placed in series can be used; if smaller, a transformer may be employed. Wireless telephony with this system, using single discharges in rapid succession, seems to be the only solution of this problem. If it should be possible to increase the number of discharges per second to such a degree that the same lies outside of the realm of the sounds used in speech, and if it should be possible to regulate the succession of discharges in such a way that no fundamental noises are apparent, it would lead to a wireless telephone system where damped antenna discharges are used for communication. The system which called forth considerable comment was the Poulsen system. Aside from the apparatus, which is fairly well known, it may be of interest to call attention to the receiver which he calls "Tikker." This is an interrupter whose function is twofold. It is to keep the receiving circuit closed for a very short time, so that the amplitude of the oscillations are brought to the maximum point before they reach the detector. Its second office is to divide the continuous oscillations into groups of such frequency that an audible sound is produced in the telephone receiver. The tikker utilizes in this way the qualities of the undamped oscillations to the highest degree, in that it uses them to charge the condensers of a closed, very weakly damped resonance circuit. The quantity of electricity stored in the condenser is suddenly discharged into a larger condenser, which is placed in parallel to a telephone. In the latter the energy collected during the time of resonance is utilized, without the clearness of sound being influenced during charging or collecting time. Later on, Poulsen modified his system and used three receiver boxes, one of which contained the primary and secondary coils of the receiver circuit. By changing the position of the coils in reference to each other it is possible to obtain any degree of receiver couples, which is a great importance in this system. The microphones of the transmitter are connected direct to the aerial wire. The strength of tone in the receiver telephone depends entirely on the changes in per cent suffered by the amplitude of the sound waves sent out from the station, affected by the action of the microphone. The advantage of the series connected microphones as used by Poulson is plain when we consider that with the same strength of sound, the percentage change of the total damping of the antenna conductors, and the amplitude of the oscillations due to the change in resistance of the microphones, is greater than when we only use one single microphone. Through the changing radiation amplitude of the transmitter we get at first changes in resistance in the circuits of the detector of the receiver, which are proportional to the changes in resistance of the transmitter microphones. The characteristic current changes resulting in this way produce in the telephone the original sounds, for we have then in the telephone a current of the same period, with which the amplitude of the transmitter oscillations increases and decreases, i. e., a current of that period possessed by the sound spoken into the microphone of the transmitter.

The Telefunkengesellschaft uses for wireless telephony a number of light arcs connected in series. The slight quantity of heat which must be removed from each arc is disposed of by means of unsymmetrically arranged electrodes, one of these consisting of carbon, the other one being a water cooled metal electrode. Usually groups of ten, twenty and more arcs are regulated at one time. The more energy is to be used the more lamps are connected in series. This method allows various kinds of oscillation. If we use an oscillation circuit of the old type, i. e., great capacity and small self induction, we obtain continuous oscillation but the variable periods. If the exciter circuit has sufficient self induction with small capacity, the period is constant, but the oscillations are not continuous, and result in an irregular powerful noise in the telephone. The practical telephone operation with this system is such that the arc circuit during speaking produces continuous oscillations. The antenna uses a certain amount of energy and some of this passes at times, when speaking, into the microphone and then again into the antenna. The smaller the resistance of the microphone the smaller will be the amplitude of oscillations in the autenna. It was found that the detector, usually a thermo-element, should not be connected into a separate receiving circuit. If this was done, sound was reproduced distorted, due probably to a deformation of the oscillation form, caused by resonance phenomena and by oscillations of periods. The detector is therefore connected direct to the antenna, giving better service, since resonance phenomena cannot appear on account of the comparatively strong damping effect of the antenna.

In 1908 the French officers Colin and Jeance made extensive experiments, which were utilized by the French government. The continuous high frequency oscillations are produced as usual by means of an arc. The arc or the arcs burn, as in Poulsen, in an atmosphere of hydrogen or carbohydrates between a copper anode and a carbon cathode. The anode consists of a very large copper cylinder, in which oil circulates for cooling purposes. The part of the anode spanned by the arc has the shape of a flat "Calotte" of about five inches diameter. The system of anodes and cathodes is stationary, but it is possible to rotate the copper anode slowly around its axis after several hours' use, in order to use other spots for the arc. Of great importance is the shape and material of the negative electrode. This consists of a very thin carbon stick of about 0.04 inches diameter, which gives the arc a great degree of stability and reliable operation for a period of 6 to 8 hours without change of carbon. Taking a purely continuous oscillation in the transmitter for granted, two methods are possible to send sounds properly. The resulting simple oscillation can be transferred direct to the antenna, or an oscillation of any desirable form is produced and, so to speak, filtered, before sending it to the antenna. The first process with a given wave length gives relatively small amounts of energy; Colin and Jeance, however, use the second method and obtain a powerful, pure oscillation with relatively small wave lengths. The filter circuit used in this system contains a capacity whose value is 1½ times as large as that of the self induction. The coupling with the autenna and with the primary circuit is very stable. The radiation system consists as usual of an antenna to which a condenser and a self inductor is connected in series. All three oscillation circuits must be exactly in harmony, and each of them must have a certain relation of capacity and self induction. It is therefore difficult to tune the apparatus properly, but when this is once done it is constant. The microphone system consists of a large number of special microphones which have a permanent intensity of 0.8 amperes.

These are connected into a current circuit which is in its turn connected with one terminal to a properly selected point of the Tesla-secondaries in the antenna with the other terminal to earth. The circuit has moreover, a variable resistance, variable self induction, and capacity. Under these conditions we have in the microphone circuit an absolutely invariable current of 1/10 of the antenna current. The usual detectors are used.

In the effort to use other arrangements of microphones, Quirino Majorana in Rome, Italy, has come forward with his improved so-called hydraulic microphone. The principle is the following: If the fluid flows in a vertical direction from a narrow orifice, it flows for some time in a spiral shaped stream, begins then to contract, to fall at last in the form of drops. It is known that mechanical disturbances acting on the pipe through which the liquid passes, favor the formation of drops. If such mechanical disturbances act suddenly and in quick succession the cylindrical section of the stream is shortened and the dissolution into drops occurs nearer to the orifice. This dissolution can be produced in a sort of acoustic rhythm, if oscillatory disturbances of an acoustic nature are made to influence the pipe. Experiments showed that these phenomena were proportional to the intensity of the impulses acting on the pipe, and for periods within the limits equal to those of the human voice. The pipe is made of a non-elastic material with the exception of a short section where the walls are thin and elastic. This section is connected to a vibrating membrane which produces its effects on the fluid in the pipe, being itself influenced by sounds spoken. If the liquid is made to fall upon two opposite metal electrodes, these are connected by this liquid, which changes according to the oscillations transmitted by the membrane. If the liquid is a conductor, we have of course a variable electrical resistance between the metal electrodes. The entire arrangement can therefore be used as a microphone. Such a microphone can stand great current strengths, because the fluid particles through which the current flows are constantly renewed, and therefore not heated to any appreciable degree. Moreover the potential difference between the electrodes can be made very high, because the conductivity of the liquid, and the distance between the electrodes, can be changed at will, i. e., the microphone can stand great quantities of energy. For this reason it is especially applicable for wireless telephony because it can be connected direct into the antenna circuit, without the fear of burning, as is the case with the carbon microphone. The distances so far have only been three to four hundred miles. While the hydraulic microphone may therefore be of great use for short distances, and for use in the field, it is not applicable for greater spans of communication, and the question of a proper microphone is still an open problem in wireless telephony. Poulsen seems to have reached the best results so far, for he was able to communicate over a distance of 500 miles without any trouble. When telephoning over short distances a common telephone connected to a thermo-element at the receiving station can be used; for longer distances this effect can be increased by using the new Brown relay.—*Bulletin Association Suisse des Eletrciciens.*

Popular magazines have more readers than trade papers have; but all of a trade paper's readers are interested in the same thing. Let them know you sell that thing.

Florida Association Convenes

The Florida Telephone Association began its annual sesions at Hotel Continental, Atlantic Beach, Wednesday morning, May 15, continuing through the 16th.

The meeting was opened at 11:30 o'clock with President W. G. Brorien, of Tampa, in the chair. The address of welcome was delivered by Mayor W. S. Jordan, of Jacksonville, to which President Brorien responded.

Routine business occupied the attention of the association, following which the reading of a number of papers was taken up by various members.

In the evening the annual dinner was held. The following unique menu had been prepared by Manager Marshal, of the Continental:

"Swinging Cross" Cocktail
"Selective Ringing" Clam Chowder
Young Onions aux "Clearing Out Signals"
"High Tension" Radishes
Broiled Fish, a la "Submarine Cable"
"Grounded Circuit" Potatoes
Deviled Crabs, Caught from the "Wheatstone Bridge"
"Phantom Circuit" Sherbet
Combination Salad, "Windstorm Effects"
"Hotel System" Toasted Crackers
"Government Regulation" Cheese
"Boiled Out" Coffee
"Special Line" Cigars
"Duplex" Cigarettes

R. L. Boyd, manager of the Southern Bell Telephone Company's system in Jacksonville presided as toastmaster, and the following toasts were given:

"Florida—the Switchboard of the United States." Hon. William S. Jordan.

"They Gotta Quit Kickin' My Dawg Aroun'," Dr. W. P. Butler.

"Our greatest Asset—A Favorable Public Opinion," G. H. Fernald.

"Co-operation—the Countersign of the Telephone Army," W. H. Adkins.

Those attending the meeting are: W. G. Brorien, Tampa, president; E. E. Voyle, Gainesville, secretary and treasurer; George H. Fernald, Sandford; M. E. Gruber, West Palm Beach; Ed. Scott, Arcadia; R. R. Reynolds, Orlando; H. R. Frazee, St. Petersburg; J. P. Phillips, Ocala; G. C. Frissell, Miami; W. B. Merck, Eustis; R. J. Foote, Clearwater; E. D. Leonard, Lakeland; A. E. Smith, Tarpon Springs; R. L. Mahaffey, Plant City; J. F. Vaughan, Tampa; W. H. Adkins, Atlanta; F. B. Vary, Jacksonville; E. F. Bussey, Atlanta; H. L. Worthington and R. L. Boyd, Jacksonville.

Texas Considering a Commission

The next legislature will probably create a public service commission in Texas similar to that in other states. Many of the public corporations favor the creation of such a commission which shall have jurisdiction over central stations, electric street railways, interurban lines, telephone and telegraph systems and all other public service corporations. The matter is being considered as to whether the new department shall be an adjunct of the Railroad Commission or a separate department. In discussing the matter, H. J. Pettingill, president of the Southwestern Telephone and Telegraph Company, expresses himself as in favor of such a department and gives it as his belief that were such a commission established in each state it would result in supplying the public with better and more efficient service and at a more economical rate.

Who's Who in the Telephone Game

Facts and Fancies About a Man You Know or Ought to Know

YOU'VE seen the kind I mean — those fellows who never change a hair—who go right along year in and year out, working like mad, whether they have to or not; get no older; always smiling; always courteous and mild mannered—the kind you wouldn't recognize if you saw a piece of crepe on 'em. They are rare, all right, but you've seen 'em, for you're looking at one right now. It is a very common practice to string out a lot of superlative blab about a man you are writing about or talking about before you let out his full name and address, but in this case you can't. You have known ever since you turned to this page that this was J. G. Ihmsen, an independent telephone man ever since we've had independent telephones.

J. G. Ihmsen is his signature. George Ihmsen is the man. Jay George Ihmsen is his name. This is offered in three parts, because they are three separate and distinct things. Mr. Ihmsen wouldn't think of signing his whole name, and you couldn't prove a "George Ihmsen" signature in court, or collect a nickel on it. Telephone men are licensed to call him George. They've been doing it for eighteen years and let it go at that. "Hello, George," and whale him one on the fat of his back, just like that! Ihmsen would be the last man in the world to object or retaliate in like manner. With him it is "Mr. Jones," or "Mr. Smith," and there is music and perfumed flowers and not a cloud in sight. His voice and manner does the trick. Oh, look at him again. He couldn't nurse a grouch for a minute—none of his kind ever does.

The New S. C. G. M.

So we'll talk about the man—George Ihmsen, who started to make telephones way back in '94 when there weren't as many telephones in the whole of North America as there are in service in Chicago right now. Talk about your pioneers! There wasn't any competition among manufacturers. You could sell complete travesty of a telephone set for a bundle of money and double the price for a special kind that would talk German. It was a perfectly lovely idea and George Ihmsen took his profits right along. It wasn't all roses, but his shop wasn't very big and he had to run out every little while to organize a company to buy equipment, and then run back and help with the order. Those were the days that chiseled the curves in Ihmsen's lips. He never got over the smile and he changes for a new steam touring car every year. Get that? Well, you don't have to crank a steamer do you? You shouldn't attempt to associate a crank with George Ihmsen!

Right here you will be told that Mr. Ihmsen was born in Pittsburgh on the first day of February, 1872. It is necessary to know that, because twenty-two years later the pride in his nativity took form in the Keystone Telephone Company which he formed. It was about this time that Peter Cooper Burns was stirring up the natives in the west, extolling the benefits of a home telephone system, one that could be purchased with ordinary, everyday coin of the realm and when he heard of the Keystone Company he rushed down to Pittsburgh and gathered it in, bringing with it, J. G. Ihmsen, who was associated with Mr. Burns for years and years, always in an official capacity and with the added burdens of general manager.

In 1910, Mr. Ihmsen retired from the American Electric Telephone Company to look after his personal affairs, and telephone men had reason to believe that this retirement would conclude his activities in the telephone field. The announcement was received with regret by hundreds of operators; the National Independent Telephone Association with which he had long been associated, and by his competitors in business, who held him in high esteem. For it is always sad to lose intimacy with a man you like and Ihmsen is a man of that kind.

J. G. Ihmsen grew to manhood in Pittsburgh. His education was acquired at Georgetown College and his first business training was with his father, a glass manufacturer. The name Ihmsen, since 1812, has been promiscuous in the glass industry.

But getting back to George, himself, that 1910 retirement was only temporary. He found after a little time with his personal affairs, that he was losing out in the general manager thing, so he accepted a place carrying that title and other honors and emoluments with the Reliance Elevator Company, Chicago—the

concern which bucks the Otis crowd. This Reliance bunch had need for a live one and they selected Mr. Ihmsen, because they liked him. And the treasurer, John Carl August Anderson, liked him especially, because he used to work for Ihmsen and wouldn't it be a good turn to have your old boss working with you? It surely would, so John Carl, etc., went over and fixed it up with J. G., and the Anderson Bros. were all tickled to pieces. So the loss of Ihmsen to the telephone field was only partial instead of complete.

And now we have Mr. Ihmsen back again in a brand new job of general managering in the telephone business. This time he is with the Stromberg-Carlson Telephone Manufacturing Company of Rochester. This funny old world is always playing tricks on us. If a smile is worth anything anywhere, it pays to carry it in the telephone business—chuck full of good fellows, but none who are better liked than the new S. C. G. M.—who will go right ahead with his smile and his soft voice, but in a larger way than ever before.

Lincoln, Neb., to be Automatic

The automatic telephone will be used exclusively in Lincoln, Neb. That decision has been anounced by the directors of the Lincoln Telephone & Telegraph company. The company also announced that it will apply for permission to increase its rates.

Thousands of tests of a careful and painstaking character were made by the engineers of the Lincoln Telephone & Telegraph Company for the purpose of affording the directors information upon which to base their decision as to whether to retain the automatic apparatus or the manual. They drew a number of interesting conclusions. The average time consumed in getting a connection on the first call was said to be about the same on both systems, but when it came to making a second or third consecutive call they reported that the automatic was much quicker, because the disconnection was made by the user and it was not necessary to call in an operator to assist in getting the second person. It was also found, due to the same mechanical fact, that although the automatic furnishes eight-thirteenths of the service, these telephones returned the busy signal no oftener than did the manual. The secrecy of the automatic is another point claimed in its favor.

The manual system has two advantages, according to the report. One of these is that there is less to get out of order. Both systems have the instruments for talking, but in addition the automatic has a calling device. The additional cost of upkeep, it was said, just about balanced the additional cost for operators under the manual system. The other advantage was the ease with which numbers under 1,000 are memorized. Another element entered into the problem. Just now there is greater activity among telephone engineers in the matter of invention than for years, due to greater freedom under modern conditions. The trend is all towards standardization of equipment, and the expectation is that within a few years apparatus will be used that combines the speed and secrecy of the automatic with the lower maintenance cost of the manual. The large investment in automatic apparatus that would have to be discarded entered into the question also. The controlling factor, however, was the preponderance of sentiment among patrons for the automatic.

In the two exchanges, which numbered something like 14,700 connections, two-thirds on one and a third on the other, there were a little over 1,200 duplications; that is, persons who subscribed to both systems. Nearly 1,000 of these were in business houses. It is expected that all of the duplicate residence telephones, when the consolidation takes place, will be discontinued, as will be done with the business telephones when one can do all the service. The consolidation will end the two-telephone nuisance in the city, and give the subscribers to each of the two present systems, now isolated, a large number of additional connections. The broadening of the service will be followed by a request of the state railway commission for permission to increase rates $1 a month for business and 50 cents a month for residence telephones. The commission will be asked to make a careful investigation and a full public hearing will afford opportunity for the public to have its say.

President Frank H. Woods points out that the new rates for combined service wil be lower than those in force in Lincoln at the time the independent company entered the field. At that time, in 1904, the Bell charged $5 and $6 per month for business telephones, $4 for individual metallic lines, $2 for gounded wire lines and $2.50 for four party lines. Then there were but 1,500 telephones in the entire system, with limited long distance facilities. It is expected that within a year there will be 15,000 telephones on the consolidated exchange, long distance connections will be available that are unlimited, and a large mass of toll lines reaching out into every part of the state in use. The taking over of the Bell makes Lincoln the center of the business in the South Platte, and means the employment of a large force of men.

As a further part of the showing, it is pointed out that the company has reduced the dividends to its common stockholders from 8 to 7 per cent, while the holders of the preferred get only 5 per cent. The consolidation and the new building will represent an expenditure of about $300,000, which will not directly increase the revenue of the company. The officers insist that as a matter of fact the application for an increase of rates will include a showing that would justify even higher rates than will be asked. They say they want to keep the public good will and they realize that this can be done only by keeping the rates at the lowest point consistent with the maintenance of the company on a sound financial basis. They have, therefore, concluded to install the proposed rates, looking to the future and the development of toll business to make up the apparent small deficiency which they figure the new rates will produce. Where business houses using both telephones have paid $8 a month one telephone, which will serve most of them, will cost but $5 on individual, or $4 on two party lines. The residence rates covering both systems are reduced from $4 to $2.50 on single lines and to $2 on two party lines, while all get universal toll service.

Rhode Island Commissioners Appointed

In accordance with a recent act of the legislature creating a Public Utilities Commission to supervise the public service corporations of the state of Rhode Island, the following members have been appointed: William C. Bliss, East Providence, chairman, for six years; Samuel E. Hodson, Woonsocket, four years; Robert F. Rodman, North Kingston, two years. The salary of the chairman is $4,000 per year and that of the other members $3,500 each.

The Law and the Telephone

By E. J. Wenner

TELEPHONE WIRES ON HIGHWAY—WIRES AT RAILWAY CROSSINGS—REMOVAL BY RAILWAY COMPANY WRONGFUL—RESPECTIVE RIGHTS OF COMPANIES CONSIDERED—REMOVAL MAY BE CRIMINAL.

John Alt vs. State of Nebraska, 129 *N. W. Rep.* 432.—John Alt was prosecuted by the State of Nebraska for wilfully and maliciously cutting the lines of York County Telephone Company at a point on the highway where same crossed the tracks of the Chicago, Burlington and Quincy Railroad Company. He was found guilty and sentenced to pay a fine of $50, from which finding he appealed to the supreme court.

A statute of the State of Nebraska regulates the use of the highways by telegraph and telephone companies, and prescribed boundaries within which poles may be set and provides certain requirements at road crossings, among which is that the height shall not be less than twenty feet above such crossings.

Another statute of the state makes criminal any breaking, destroying or cutting of telephone poles, wires or fixtures.

The York County Telephone Company, acting under the authority of the statute, erected its poles along a certain highway and strung telephone wires thereon, which wires were used for long distance service. At a point where the highway and telephone lines crossed the tracks of the railroad company the wires were supported by two 45-foot poles. The poles were 115 feet apart, one being 7 feet and the other 8 feet outside of the railroad right of way. Both were within proper boundaries in the highway and the wires were suspended more than thirty feet above the rails at the crossing. The poles and wires were kept in good condition and did not interfere with the passage of trains. The wires were high enough so as not to interfere with a man standing on a box car on a train.

On several occasions the wires had been cut and it was thought by the telephone company that employees of the railroad company were responsible for the damage. An agent of the telephone company secreted himself in the neighborhood of the crossing, and when a section gang and a bridge gang appeared and intimated they would cut the wires, accosted them and remonstrated with them without avail. The defendant, Alt, climbed a pole and cut one of the wires and placed it outside of the railway right of way, but after further warning cut no others. The evidence to secure conviction was furnished by the agents of the telephone company.

The defendant relied upon a statute of the State of Nebraska, which provides that all persons, associations and corporations engaged in generating and transmitting electric current for sale in the state, for power or other purposes, must obtain permission to cross the right of way of a railroad company. The court held that the telephone company was not such a corporation as was contemplated in this section inasmuch as its wires were used for telephone service and not for the purpose prescribed in the statute mentioned. The court said "It is apparent from the entire act that it does not apply to telephone lines constructed and used exclusively for such a purpose, and that it affords no justification for the conduct of defendant in cutting the wires."

In discussing the contention of the defendant that the wires were an obstruction to trains the court made use of the following language: "When defendant cut the wires in the public highway, they were not obstructing trains or endangering railroad employees. If the rights or property of the railroad company were invaded by the telephone company, as suggested by defendant, the courts were open for the purpose of granting adequate relief. Under the facts disclosed by the record, the protection of those rights did not justify a resort to violence, or require the destruction of property which was at the time on a public highway and being used in the public service, and the jury was justified in so finding."

A text writer says: "A telephone wire stretched over the property of another without authority, but causing no obstruction, is not a nuisance which may be summarily abated by cutting the wire."—McMillan, Teleph. Law, Sec. 88.

In a case in point the following language was used by the supreme court of Alabama, though the opinion was not officially reported: "The theory of the defense was, and is, that as the owner of the telephone line, without the consent of the railroad company, and without condemnation proceedings, had crossed the right of way of the railroad company, the railroad company had the right to cut and remove the wire, and its employee acting under its instructions could therefore be guilty of no offense. The facts in the case will not justify such defense. The telephone line as constructed created no obstruction to the railroad company in the operation of its road, and if it should be conceded that the owner of the telephone line violated the property rights of the railroad company, in erecting the telephone line without first having obtained consent, or having taken condemnation proceedings, this would not authorize the defendant, under the instructions of the railroad company, to take the law into his own hands in plain violation of the statute. The statute is clear and unambiguous in its language, and makes it an offense for any one to willfully cut a telephone line. It makes no exception and certainly the facts in the case before us do not create one, but leave the defendant undoubtedly within its provisions. Nor is it material whether the cutting was done with an evil motive or purpose; it is enough if it was done willfully."—McGowan vs. State, 146 *Ala.* 679, 40 *So.* 142.

For Want of a Wire the Horse was Lost

B. W. Ware, a negro of Vicksburg, Miss., is suing the Cumberland Telephone Company, claiming damages in the sum of $1,000, alleging that as he failed to get the proper telephone connection to get him home to call in a doctor for his sick horse, the animal died for want of attention. The suit is one of the most novel claims ever presented.

New York Commission News

The New York Public Service Commission, second district, has ordered a public hearing upon the complaint of the Postal Telegraph-Cable Company made against the New York Telephone Company alleging that the telephone company is by illegal discrimination diverting to the Western Union Telegraph Company telegrams which are intended for the Postal Telegraph-Cable Company. The order providing for the hearing recites that it appears from a communication received from the New York Telephone Company, and otherwise, that it is the practice of the telephone company to connect subscribers and others with the Postal Telegraph-Cable Company when the subscriber calls for "Postal" or for the number shown in the directory and that it is the practice to connect subscribers and others with the Western Union Telegraph Company upon the subscriber giving the number assigned to the Western Union, or the name "Western Union," or upon using simply the word "Telegram"; and that there appears to be sufficient reason from the facts informally submitted to the commission to inquire and investigate as to whether the use of the word "Telegram" in calling for the Western Union Telegraph Company is not giving an undue or unreasonable preference to the Western Union, and if the differing methods of calls for the two telegraph companies does not occasion confusion and annoyance to those desiring to communicate with the Postal Telegraph company.

The New York Telephone Company, Western Union Telegraph Company, and Postal Telegraph-Cable Company were notified to attend and present such arguments and evidence in the matter as may appear to be material to enable the commission to determine whether or not the practices of the telephone company are unduly or unreasonably preferential.

The commission has dismissed the complaint of Milford D. Whedon of Granville, Washington county, against the New York and Vermont Home Telephone Company. The company charges in this locality fifty cents a month for the use of an extension telephone. This the complainant alleges is unjust and should not be in excess of ten cents per month. He asks that the commission issue an order requiring it to permit him to install in his office and home at his own expense an extension telephone and have the same connected with the telephone system of the company and that he be permitted to use this extension telephone without any charge on the part of the company.

In the order made by the commission it is recited that if it were to grant the relief asked for by this complainant, it would necessarily throughout its entire jurisdiction have to permit the unlimited connection of extension telephones by subscribers to the service without charge and without control of the character of instruments connected or their maintenance by the telephone company. This practice, the commission says, would be so obviously improper that it cannot be sanctioned by the commission and it is unnecessary to have a hearing upon any case which involves such relief only.

The complainant is given permission, if he desires to prosecute his complaint upon the theory that the charge of fifty cents per month is excessive and should be reduced, to have the commission proceed upon his part of the complaint in the usual manner.

The Austrian government will place an order for 20,000 telephones in the near future.

Charter is Franchise in Wisconsin

The Supreme Court of Wisconsin has just rendered a decision in which it holds that the law which gives the Railroad Commission supervisory power over public utility corporations automatically amends the franchises of all utilities within the state to conform to its provisions.

In the special case under consideration action was brought by the City of Kenosha against the Kenosha Telephone Company to enjoin the company from charging for certain telephones furnished the city, claiming that said company was the successor of the Citizens' Telephone Company and as such was under obligations to furnish service over these particular telephones free of charge in accordance with section 8 of an ordinance passed by the city in 1903 and accepted by the Citizens' company, which ordinance also contained a section stating said ordinance became void should the company sell out. Later the company did sell, but it was clearly stipulated in the agreement that the franchise was not included in the sale. The Kenosha company continued to supply service free until November, 1908, when it was notified by the Railroad Commission that the action was unlawful and refused to do so longer.

The court also brought out the point and re-affirmed the same, that a telephone company needs no other franchise to enable it to do business any place in the state other than the franchise bestowed upon it when it is incorporated in accordance with section 1778 statutes, claiming such franchise gives the incorporated company authority to construct its lines upon the public highways and streets, subject only to reasonable regulations under police power and any franchise granted by the city is void.

The complaint had been dismissed by the lower court on the ground that the Kenosha Home Company was not the successor of the Citizens' Company, while the Supreme Court maintained that the question depended upon the validity of the franchise issued by the city. And even though the franchise were valid in the beginning the court claimed it had been repealed by the enactment of the public utility law which prohibits the granting of service for less than the rates given in the schedule of any public utility. Thus the decision of the lower court was affirmed.

Oklahoma Commission News

All cases pertaining to electric utilities set for hearing on May 14, by the Oklahoma Commission, have been continued for the term. Included among these is an order from the commission requiring all telephone companies to have stenciled on all poles, towers or other frame structures before January 1, 1913, the initials, abbreviations of the name, or a corporate symbol of the company, or some other distinguishing sign, which may be put on with paint or as a metal tag.

In the case against Lewis T. Hine, owner of the Lexington-Purcell Telephone Company, in which it was alleged that the company discriminated in its rates, charging some patrons $1 for residence telephones and others $1.50 and $2 and $2.50 for business telephones, the commission ordered that all rates shall be equal. An appeal was taken, but the commission was sustained in its decision after which the company applied for permission to increase its rates, but was refused.

DEPARTMENT of RAILWAY TELEPHONES

Telephone Specialist of the N. Y., N. H. & H.

H. A. Shepard, Asst. Sup't of Telegraph

SOME sixty years ago the New York, New Haven and Hartford Railroad had no superintendent of telegraph. Consequently the city of New Haven, Conn., where that official is now stationed, was so unimportant that the railroad did not even come ashore until it had passed Chapel street. Instead it ran along an embankment in Long Island Sound, or, rather, in that arm of it known as New Haven harbor, about half a mile from shore, and the fishermen of the sound moored their boats in the "basin" on the inner side of the tracks.

The man from New York, enroute to Hartford, Conn., via the N. Y., N. H. & H., looks out of the car window with complacent approval as the train turns north from New Haven.

"Well, what," he inquires, "do you know about that? Real modern system, running into town below the surface, with the streets crossing on the level and all that. Quite enterprising, some of these villages." Isn't it a shame to tell him that sixty years ago, when the road was still entering New York at grade, New Haven was enjoying the advantages of a subterranean railroad entrance? For the New Haven road runs, for a part of the way between Hartford and New Haven, in the bed of the old Northampton and New Haven canal, dry these seventy years or more.

H. A. Shepard, N. Y., N. H. & H.

Though the N. Y., N. H. & H. was not the first to dispatch its trains by electrical signals, it has always been distinctly up to the minute in adopting improvements—thanks to the habits of early days. Its old charter provided that all profits above ten per cent should go to the state of Connecticut. Its shrewd directors, with a spirit truly modern, promptly arranged to put everything above the ten-per-cent dead line into improvements. Railroading was profitable in those days, and the improvements multiplied fast. That is why the New Haven is such a good road today; and we may well feel skeptical as to whether the commonwealth itself could have done as well with the money.

Away up in the northwest corner of Vermont, 255 miles from New Haven as the bee aviates, and only six miles 'cross country from Lake Champlain, lies the village of East Highgate. Here it was that our hero was born some thirty-two years, four months and fifteen days ago—December 15, 1879, if you insist on the date. When he had accumulated all the education and edification that the East Highgate common schools, the Green Mountains and the historic setting could convey to him, H. A. Shepard grew up and went to work. He was seventeen years old at the time, and his job was digging holes through six feet of frost for the New England Telephone and Telegraph Company. He worked under J. K. Butler, superintendent of the northern division, with headquarters at Burlington, Vt., about forty miles from his home. Starting thus at the bottom,

Department of Railway Telephones

This department is established as a permanent feature of TELEPHONE ENGINEER. The progress of the art of telephone train dispatching, its technical development, its news, and the elucidation of its mysteries for the non-technical worker will be found each month in these pages. The editors invite the problems and solicit the co-operation of the many readers of TELEPHONE ENGINEER in all parts of the world whose interests lie along these lines.

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or six feet below it, he acquired a thorough grounding in telephone construction, as well as a robust constitution, both of which have served him well.

He soon qualified as a first-class lineman, and after serving for seven months was promoted to assistant line foreman. At the end of four years he became line foreman and worked in that capacity during the last three years of his service with the telephone company, during which time he built many miles of trunk lines as well as local and farmers' lines, and incidentally availed himself of the opportunity of learning instrument and switchboard work.

October 27, 1902, Shepard entered the service of the telephone department of the New York, New Haven and Hartford Railroad as inspector, stationed at Providence, R. I.

February 1, 1904, the telephone and telegraph departments of the New Haven were consolidated under N. E. Smith, superintendent of telegraph. April 1, 1908, Mr. Shepard was promoted to chief inspector of the western district, with headquarters at New Haven. And May 15, 1909, he was appointed assistant superintendent of telegraph, which position he now holds.

H. A. Shepard's duties are confined to the telephone branch of the department, and he has charge of construction and maintenance over the entire system—local and trunk line circuits, train dispatching circuits, magneto and common battery switchboards. In short, he is a railway telephone specialist. He will accept nothing but first-class work, which, thanks to his early experience in doing it himself, he is well qualified to judge. And as to the beforementioned constitution acquired at the same time, Shepard weighs 225, would not hesitate to challenge all comers if he felt like it, and takes to boxing and horseback riding as his hobbies. The better to pursue these pastimes he became associate member of Troop A Cavalry, Connecticut National Guard. He also belongs to Adelphi lodge, A. F. and A. M., and to the Association of Railway Telegraph Superintendents.

Telegraph Superintendents Meet June 4

The Association of Railway Telegraph Superintendents will meet in annual convention at the Waldorf-Astoria Hotel, New York City, June 4. A very interesting and comprehensive program has been prepared, which will consist of the presentation and discussion of many valuable papers. There will also be ample exhibits of apparatus. The program of papers is as follows:

"Maintenance Standards and Methods," by G. M. Yorke, engineer, Western Union Telegraph Company, New York; "Possibilities of High Speed and Automatic Telegraph Systems in Railroad Service," by W. N. Fashbaugh, traffic engineer, Western Union Telegraph Company, New York; "The Handling of Supplies," by W. G. Higgins, superintendent supplies, Western Union Telegraph Company, New York; "Construction Standards and Methods," by R. E. Chetwood, engineer of construction, Western Union Telegraph Company, New York; "What the Telephone Has Done for the Santa Fe Railway," by L. M. Jones, superintendent telegraph, Atchison, Topeka & Santa Fe Railway, Topeka, Kan.; "The Use of the Main Line Relay in Telephone Selector Operation," by W. W. Ryder, general superintendent of telegraph, New York Central Lines, Chicago, Ill.

Due attention has been given the social side of the convention and the entertainment committee has spared no effort to provide for the enjoyment of its visitors. The social program includes an informal reception at the Waldorf at 8:30 p. m., June 3. On Friday the entire company will go by special train to West Orange, N. J., where a visit will be made to the Edison works, and the visitors will be entertained at luncheon by the Country Club as the guests of Mr. Edison, after which they will return to Jersey City and thence to Travers Island and participate in a clambake given by Belvidere Brooks, in behalf of the Western Union Telegraph Company.

The Baltimore & Ohio to Install More Telephones

The Baltimore & Ohio Railroad, which was one of the pioneers in the telephone train dispatching field, has recently placed another order with the Western Electric Company for selector equipment to be used in extending its facilities for dispatching trains by telephone.

The division to be equipped lies west of Cincinnati, extending from that place to Montgomery, Ind., and branching off at Seymour, Ind., to go to Louisville, Ky., and Jeffersonville, Ind. There will be three circuits paralleling each other, one for transmitting train orders, called a "train wire," another for transmitting messages in general, called a "message wire," and a third, a "block wire," to be used to enable the block tower men to get into quick communication with each other. A feature of the message wire is that it is arranged for "intercalling," or, in other words, way-stations can call each other.

The apparatus to be used is the Western Electric No. 102-B type selector set, containing the No. 50 type selector. There will be one hundred selector stations so equipped, covering a stretch of approximately 250 miles. In all there will be over 800 miles of circuit, for train, message and block service.

Telephones on the Pittsburgh and Lake Erie

One of the latest railroads to join the ranks of those using the telephone for the handling and control of trains is the Pittsburgh and Lake Erie. With this end in view the officials of the road have recently placed an order with the Western Electric Company, the manufacturer of the telephone apparatus used by a great many of the railroads in the United States, for the material necessity to equip their line.

The railroad has three branches, each of which terminates at Pittsburgh, the branches extending to Youngstown, Ohio, a distance of about seventy miles; to Connellsville, Pennsylvania, about sixty miles, and to Brownsville, Pennsylvania, about fifty-five miles. As Pittsburgh is the natural center of the system, the dispatcher will be located at that point. Two complete dispatcher's equipments will be used, so that two calls may be placed simultaneously on either end of the line.

The apparatus to be used is the No. 101-B selector set, containing the standard Western Electric No. 50 type selector. Forty-four way stations will be so equipped, while at the Pittsburgh office there will be motor-generator sets, storage batteries and a battery switchboard panel to be used in connection with the furnishing of ringing and talking current.

Transatlantic liners at their piers in New York now have telephone connection with the city.

Railway Telephone Report for 1911

Interstate Commerce Commission

DEVELOPMENT of the railway telephone for dispatching purposes, as shown by the report of the Interstate Commerce Commission for January 1, 1912, just issued, was not so great in 1911 as in the previous year. During 1910 there was a net gain on steam railroads of 11,768 miles, as against a gain for 1911 of 6,867 miles. Analysis of this discrepancy, however, shows that the remarkable increase of 1910 was due to the fact that many of the big roads then installed their initial equipment, and their later installations, in the nature of increases, have not been so spectacular. In other words, the growth of railway telephony in 1910 was abnormal; that of 1911 was normal and healthy, and forms an excellent criterion by which to judge the scope of the field.

As indicated by the totals at the foot of the table, the entire railroad mileage of the country as of January 1, 1912, as reported to the Interstate Commerce Commission in response to its order of September 23, 1911, was 224,283. This compares with the previous year's report of 215,003, a gain of 9,280. Both of the totals include those electric railroads which, because of their interstate operation, come under the jurisdiction of the commission. These roads were indicated by an asterisk in last year's report, but are not specially identified in the present table. Their total mileage last year, however, was only 3,605, all operated by telephone.

It will be noted that where the telephone mileage of a railroad has increased, its telegraph mileage has not necessarily decreased in like proportion. As the figures indicate, there are sections of line on which both the telegraph and the telephone are used and there are other sections of line on which neither the telegraph nor the telephone is used for transmission of train orders. The total decrease of telegraph mileage from the report of 1911 is 5,811.

Names of railroads.	*Telegraph (miles of road).*	*Telephone (miles of road).*	*Total operated (miles of road).*
Ahnappee & Western	34	....	34
Albany Southern	36	36	36
Alton, Granite & St. Louis	....	55	55
Amador Central	....	12	12
Ann Arbor	292	....	292
Arizona & New Mexico	109	....	109
Arizona Southern	20	20	20
Arkansas Central	46	....	46
Arkansas Western	....	32	32
Ashland & Western	22	22	22
Atchison, Topeka & Santa Fe	3,880	5,947	9,827
Atlanta & West Point	86	....	86
Atlanta, Birmingham & Atlantic	662	....	662
Atlantic & Western	....	9	9
Atlantic Coast Line	3,570	478	4,048
Attleboro Branch	....	3	3
Au Sable & Northwestern	....	67*	67
Baltimore & Ohio	3,281	121	3,441
Baltimore & Ohio Chicago Terminal	76	....	76
Baltimore & Ohio Southwestern	980	....	985
Baltimore & Sparrow's Point	5	5	5
Baltimore, Chesapeake & Atlantic	87	....	87
Bangor & Aroostook	623	....	623
Beaver Dam	....	16	16
Bellingham Bay & British Columbia	....	56	56
Beaumont & Great Northern	49	....	49
Bennettsville & Cheraw	....	45	45
Bessemer & Lake Erie	....	194	200
Big Fork & International Falls	34	....	34
Big Sandy & Cumberland	....	24	24
Bloomsburg & Sullivan	29	....	29
Blue Ridge	44	....	44
Boston & Maine	1,994	232	2,238
Boise & Interurban	....	29	29
Boyne City, Gaylord & Alpena	....	93	93
Brockton & Plymouth	....	23	23
Brownstone & Middletown	....	3	3
Buffalo & Lake Erie	....	101	101
Buffalo & Susquehanna R. R.	251	13	264
Buffalo & Susquehanna Ry	91	....	91
Buffalo, Attica & Arcade	28	....	28
Buffalo, Rochester & Pittsburgh	427	....	427
Bullfrog-Goldfield	74	....	74
Butler County	9	....	9
Butte, Anaconda & Pacific	30	....	30
Butte County	31	31	31
Chautauqua Traction	....	25	25
Carolina & Northwestern	12	6	133
Central Indiana	127	....	127
Central of Georgia	1,923	....	1,923
Central New England	277	....	277
Chattahoochee Valley	....	33	33
Central R. R. of New Jersey	505	....	505
Central R. R. of Pennsylvania	27	....	31
Charlotte, Monroe & Columbia	....	18	18
Central Vermont	379	149	528
Chesapeake & Ohio	591	964	1,555
Chesapeake & Ohio Ry. of Indiana	262	....	262
Charleston & West Carolina	340	....	340
Chesapeake Beach	28	....	28
Chesapeake Western	40	40	40
Chestnut Ridge	....	12	12
Chicago & Alton	1,006	19	1,025
Chicago & Eastern Illinois	952	124	1,076
Chicago & Illinois Midland	25	....	25
Chicago & Illinois Western	11	....	11
Chicago & Milwaukee	....	86	86
Chicago & Northwestern	6,487	1,318	7,897
Milwaukee, Sparta & North Western	....	146	154
Chicago & Western Indiana	....	27	27
Chicago, Anamosa & Northern	....	6	35
Chicago, Burlington & Quincy	6,219	2,946	9,022
Chicago Great Western	1,180	290	1,470
Chicago, Harvard & Geneva Lake	....	13	13
Chicago, Indianapolis & Louisville	578	....	578
Chicago, Lake Shore & South Bend	....	76	76
Chicago, Milwaukee & Gary	99	63	99
Chicago, Milwaukee & St. Paul	6,141	1,136	7,277
Chicago, Milwaukee & Puget Sound	1,948	1,948	1,948
Chicago, Peoria & St. Louis Ry. of Illinois	237	15	237
Chicago, Rock Island & Pacific	3,945	2,977	6,922
Chicago, Rock Island & Gulf	397	72	469
Chicago, St. Paul, Minneapolis & Omaha	1,679	....	1,679
Chicago, South Bend & Northern Indiana	....	67	67
Chicago, Terre Haute & Southeastern	196	155	351
Cincinnati, Georgetown & Portsmouth	....	54	54
Cincinnati, Flemingsburg & Southeastern	6	....	6
Cincinnati, Hamilton & Dayton	564	....	608
Cincinnati, Indianapolis & Western	361	....	361
Cincinnati, Lawrenceburg & Aurora	....	32	32
Cincinnati, Lebanon & Northern	46	46	46
Cleveland & Erie	....	33	33
Coal & Coke	192	198	198
Colfax Northern	....	13	13
Colorado & Southern	997	....	997
Colorado & Wyoming	51	....	51
Colorado Midland	246	....	261
Colorado Springs & Cripple Creek District	51	....	51
Columbia & Puget Sound	34	22	56
Columbia, Newberry & Laurens	75	....	75
Columbus & Southern	....	23	23
Copper Range	....	82	82
Cornwall	13	....	13
Cornwall & Lebanon	22	....	22
Coudersport & Port Allegany	39	....	39
Crystal River	17	....	17
Cumberland & Pennsylvania	3	28	31
Cumberland Valley	....	207	207
Dansville & Mount Morris	15	....	15
Danville & Western	78	5	83
Davenport, Rock Island Northwestern	42	....	42
Dayton & Union	32	....	82
Dayton, Covington & Piqua Traction	....	31	31
Dayton, Lebanon & Cincinnati	23	30	30
Delaware & Hudson	821	....	843
Deering Southwestern	....	31	31
Delaware, Lackawanna & Western	....	974	985
Denison & Pacific Suburban	7	....	7
Denver & Rio Grande	2,500	52	2,552
Denver, Boulder & Western	47	....	47
Denver, Northwestern & Pacific	214	214	214
De Queen & Eastern	....	27	27
Detroit & Mackinac	208	150	358
Detroit & Charlevoix	....	42	42
Detroit & Toledo Shore Line	48	15	48
Detroit, Jackson & Chicago	....	96	96
Detroit, Monroe & Toledo Short Line	....	52	52
Detroit, Toledo & Ironton	339	....	339
Dry Fork & Red Creek	....	37	37
Detroit United	....	135	135
Duluth & Iron Range	....	150	150
Duluth & Northeastern	....	59	59
Duluth, Missabe & Northern	167	9	176
Duluth, South Shore & Atlantic	588	....	588
Durham & Southern	....	56	56
East Broad Top R. R. & Coal Co.	36	46	46
East Carolina	38	....	38
Eastern Kentucky	36	....	36
East St. Louis & Suburban	....	57	57

Names of railroads.	Telegraph (miles of road).	Telephone (miles of road).	Total operated (miles of road).
East Jordan & Southern	....	19	19
Elgin, Joliet & Eastern	205	8	213
Erie	1,699	175	1,874
Bath & Hammondsport	....	10	10
Chicago & Erie	249	....	249
Columbus & Erie	13	....	13
Erie & Jersey	39	....	39
Genessee River	....	32	32
New Jersey & New York	38	....	38
New York, Susquehanna & Western	233	....	233
Erie & Michigan Ry. & Navigation Co	....	8	8
Escanaba & Lake Superior	80	....	80
Eureka & Palisade	88	....	88
Evansville & Indianapolis	146	....	146
Evansville & Southern Indiana	....	33	33
Evansville & Terre Haute	56	109	165
Farmers' Grain & Shipping Co	66	....	66
Florence & Cripple Creek	40	....	40
Florida	....	65	65
Florida East Coast	575	....	575
Fonda, Johnstown & Gloversville	32	....	32
Fort Dodge, Des Moines & Southern	....	159	159
Fort Smith & Western	217	....	217
Fort Wayne & Springfield	....	22	22
Fort Wayne & Wabash Valley Traction	....	139	139
Fort Worth & Denver City	453	....	453
Fort Worth & Rio Grande	196	....	196
Galveston, Houston & Henderson	50	....	50
Genesee & Wyoming	16	16	16
Georges Valley	8	8	8
Georgia	58	245	303
Georgia Coast & Piedmont	82	....	82
Georgia, Florida & Alabama	194	....	194
Georgia Northern	68	....	68
Georgia Southern & Florida	396	....	396
Georgia Southwestern & Gulf	35	....	35
Grand Rapids, Grand Haven & Muskegon	....	41	41
Grand Trunk	1,131	....	1,131
Great Falls & Old Dominion	....	28	28
Great Northern	3,224	3,881	6,905
Great Western	....	57	57
Green Bay & Western	250	....	250
Hazelhurst & Southeastern	8	16	24
Hillsboro & Northeastern	....	5	5
Hocking Valley	338	....	338
Holton Interurban	10	8	18
Houston & Brazos Valley	....	20	20
Huntingdon & Broad Top Mountain Railroad & Coal Co.	....	71	71
Idaho Northern	61	....	61
Illinois Central	2,531	2,050	4,581
Yazoo & Mississippi Valley	1,371	....	1,371
Illinois Terminal	15	....	15
Illinois Traction	....	436	436
Indianapolis & Louisville Traction	....	41	41
Indianapolis, Crawfordsville & Western Traction	....	45	45
Indiana Union Traction	....	313	313
International	32	32	32
International & Great Northern	1,144	....	1,144
Interstate	....	27	27
Interstate Consolidated	....	27	27
Inter-Urban	....	59	59
Iowa & Illinois	....	40	40
Ironton	....	10	10
Jamestown, Chautauqua & Lake Erie	33	....	33
Jefferson & Northwestern	....	36	36
Joplin & Pittsburgh	....	98	98
Kanawha & Michigan	162	2	164
Kanawha, Glen Jean & Eastern	....	14	14
Kansas City, Clinton & Springfield	154	....	154
Kansas City Southern	827	....	827
Kansas City Terminal	6	8	12
Kansas Southwestern	59	....	59
Kennebec Central	5	5	5
Kentucky & Indiana Bridge & Railroad Co	11	....	11
Kentucky & Tennessee	....	8	10
Kentwood & Eastern	....	52	55
Kewanee, Green Bay & Western	37	....	37
Keweenaw Central	26	....	39
Klamath Lake	....	24	24
Lackawanna & Wyoming Valley	....	23	23
La Crosse & Southeastern	....	41	41
Lake Champlain & Moriah	....	7	7
Lake Side & Marblehead	....	77	77
Lake Superior & Ishpeming	19	....	26
Lake Tahoe	....	16	16
Lancaster & Chester	29	....	29
Larmie, Hahns Peak & Pacific	....	55	55
Leavenworth & Topeka	47	....	47
Lehigh & Hudson River	73	....	73
Lexington Terminal	3	....	3
Lehigh & New England	139	98	139
Lexington & Eastern	96	....	96
Lehigh Valley	633	749	1,382
Liberty White	....	34	34
Licking River	....	32	32
Litchfield & Madison	44	....	44
Little River	....	8	8
Livingstone & Southeastern	....	7	7
Live Oak, Perry & Gulf	74	....	74
Long Island	388	....	388
Lorama	....	14	14
Los Angeles & Redondo	....	37	37
Los Angeles Pacific	....	177	177
Louisiana & Arkansas	252	....	252
Louisiana & Northwest	121	....	121
Louisiana & Pacific	43	43	76
Louisiana Central	....	18	43
Louisiana Railway & Navigation	313	....	313
Louisville & Nashville	2,988	1,229	4,217
Louisville & Northern	....	17	17
Louisville & Southern Indiana Traction	....	9	9
Louisville, Henderson & St. Louis	188	....	188
Lowville & Beaver River	....	10	10
McCloud River	15	46	46
Macon & Birmingham	105	105	105
Macon, Dublin & Savannah	93	54	93
Maine Central	1,155	....	1,155
Portland Terminal	25	....	25
Manchester & Oneida	....	8	8
Manistee & Grand Rapids	72	....	72
Manistee & North Eastern	182	....	182
Manistique & Lake Superior	....	37	37
Mansfield Railway & Transportation Co	....	16	16
Marquette & Southeastern	27	24	51
Maryland & Pennsylvania	77	....	77
Maryland, Delaware & Virginia	8	6	78
Maryland Electric	2	27	27
Midland Terminal	29	....	29
Midland Valley	288	....	288
Milford, Attleboro & Woonsocket	....	28	28
Minneapolis & Rainy River	....	70	70
Minneapolis & St. Louis	995	....	995
Albia & Centerville	24	....	24
Iowa Central	537	....	537
Minneapolis, St. Paul & Sault Ste. Marie	3,492	212	3,704
Mineral Point & Northern	26	26	26
Minnesota & International	211	....	211
Mississippi Central	150	26	150
Mississippi Eastern	27	....	27
Mississippi River & Bonne Terre	53	....	53
Missouri & Illinois Bridge & Belt	3	3	3
Missouri & Louisiana	....	30	30
Missouri & North Arkansas	365	....	365
Missouri, Kansas & Texas	2,105	759	2,886
Missouri, Oklahoma & Gulf	224	....	224
Missouri Pacific	3,887	....	3,887
St. Louis, Iron Mountain & Southern	2,849	315	3,203
Missouri Southern	....	54	54
Mobile & Ohio	809	14	827
Monongahela	....	67	67
Monroe	10	....	10
Monson	6	....	6
Montour	10	12	22
Montpelier & Wells River	44	....	44
Morenci Southern	18	18	18
Moscow, Camden & San Augustine	7	7	7
Mount Jewitt, Kinzua & Riterville	....	18	18
Munising, Marquette & Southeastern	72	74	124
Muscatine North & South	43	....	43
Nacogdoches & Southeastern	....	20	20
Nashville, Chattanooga & St. Louis	1,230	....	1,230
Natchez, Columbia & Mobile	....	18	30
Nevada-California-Oregon	237	....	237
Nevada Central	93	93	93
Nevada County Narrow Gauge	....	21	21
Newburgh & South Shore	7	....	7
New Jersey, Indiana & Illinois	....	11	11
New Mexico Central	116	....	116
New Orleans & Northeastern	196	....	196
New Orleans & Great Northern	243	....	243
New Orleans, Mobile & Chicago	397	15	412
New Orleans, Natalbany & Natchez	....	30	30
New Orleans Terminal	15	6	21
New York & Long Branch	....	38	38
New York & Pennsylvania	....	57	57
New York, Auburn & Lansing	....	37	37
New York Central Lines:..			
Boston & Albany	10	377	387
Chicago, Indiana & Southern	....	304	304
Cincinnati Northern	206	....	206
Cleveland, Cincinnati, Chicago & St. Louis	532	1,348	1,880
Kankakee & Seneca	43	....	43
Peoria & Eastern	338	....	338
Lake Erie & Western	872	571	872
Lake Shore & Michigan Southern	337	1,241	1,578
Cleveland Short Line	....	11	11
Dunkirk, Allegheny Valley & Pittsburgh	....	90	90
Lake Erie & Pittsburgh	....	27	27
Lake Erie, Alliance & Wheeling	....	88	88
Little Falls & Dolgeville	10	4	14
Michigan Central	443	816	1,259
New York Central & Hudson River	1,988	912	2,900
New York & Ottawa	69	....	69
Peoria & Eastern	338	....	338
Pittsburgh & Lake Erie	190	3	193
Rutland	416	....	416
Toledo & Ohio Central	118	277	395
Zanesville & Western	85	....	85
New York, Chicago & St. Louis	275	248	523
New York, New Haven & Hartford	1,885	121	2,006
New York, Ontario & Western	493	....	493
New York, Philadelphia & Norfolk	....	112	112
Norfolk & Portsmouth Belt	....	14	14
Norfolk & Western	709	982	1,881
Norfolk Southern	519	222	565
Northampton & Hertford	9	9	9
Northern Pacific	3,853	1,817	5,670
Northwestern Pacific	231	182	413
Northwestern R. R. of South Carolina	41	....	41

Names of railroads.	Telegraph (miles of road).	Telephone (miles of road).	Total operated (miles of road).
Norwood & St. Lawrence	....	18	18
Ohio Electric	....	40	40
Ohio River & Columbus	....	24	24
Ohio Valley Electric	....	16	16
Ohio Valley Scenic Route	....	39	39
Pacific & Idaho Northern	90	....	90
Pacific Electric	....	803	803
Pajaro Valley Consolidated	....	32	32
Peach River	....	29	29
Pemberton & Highstown	24	24	24
Pennsylvania	1,635	1,958	3,828
Calumet Western	3	....	3
Cherry Tree & Dixonville	....	28	38
Cleveland, Akron & Cincinnati	326	....	326
Grand Rapids & Indiana	580	8	580
Manufacturer's	3	....	3
New York Bay	2	2	2
Northern Central	367	49	433
Pennsylvania Co.	1,211	131	1,342
Philadelphia, Baltimore & Washington	570	120	705
Pittsburgh, Cincinnati, Chicago & St. Louis	1,421	2	1,423
Union R. R. of Baltimore	7	7	10
Vandalia	827	....	827
West Jersey & Sea Shore	229	84	313
Pensacola, Alabama & Tennessee	....	23	23
Peoria & Pekin Union	15	....	15
Peoria Railway & Terminal	8	2	10
Pere Marquette	1,167	562	1,729
Pennsylvania Southern	....	69	69
Peoria Northern	20	20	20
Philadelphia & Reading	933	36	983
Atlantic City	167	....	167
Catasauqua & Fogelsville	29	....	31
Chester & Delaware	3	....	5
Gettysburg & Harrisburg	39	....	42
Middletown & Hummelstown	6	....	6
North East Pennsylvania	26	....	26
Perkiomen	38	....	38
Philadelphia & Chester Valley	24	....	24
Philadelphia, Newton & New York	22	....	22
Pickering Valley	11	....	11
Port Reading	20	....	21
Reading & Columbia	59	....	59
Rupert & Bloomsburg	2	....	2
Stony Creek	10	....	10
Tamaqua, Hazelton & Northern	10	....	10
Williams Valley	3	8	11
Phillipsburg Horse Car R. R.	....	4	4
Pickins	....	9	9
Pittsburgh & Moon Run	....	5	5
Pittsburg & Susquehanna	....	16	16
Pittsburgh, Lisbon & Western	25	....	25
Pittsburgh, Shawmut & Northern	176	138	251
Prescott & Northwestern	....	41	41
Providence & Danielson	....	26	26
Providence & Fall River	....	2	12
Potomac, Fredericksburg & Piedmont	....	38	38
Quincy, Omaha & Kansas City and Iowa & St. Louis	288	20	308
Quanah, Acme & Pacific	....	42	42
Queen & Crescent Route:			
Cincinnati, New Orleans & Texas Pacific	197	138	335
Alabama Great Southern	291	....	291
Harriman & Northeastern	....	20	20
Woodstock & Blocton	8	....	8
New Orleans & Northeastern	196	....	196
Alabama & Vicksburg	139	....	139
Vicksburg, Shreveport & Pacific	169	....	169
Rapid	....	99	99
Raleigh & Southport	64	35	64
Raritan River	....	17	17
Reynoldsville & Fall Creek	....	25	25
Richmond, Fredericksburgh & Potomac	....	88	88
Rio Grande	....	23	23
Rockford & Interurban	....	77	77
St. Johns River Terminal	5	....	5
St. Joseph & Grand Island	259	....	259
St. Louis & Hannibal	104	....	104
St. Louis & San Francisco	3,847	746	4,722
Beaumont, Sour Lake & Western	118	....	118
Fort Worth & Rio Grande	221	....	221
New Orleans, Texas & Mexico	264	....	264
Orange & Northwestern	62	....	62
St. Louis, San Francisco & Texas	85	....	85
St. Louis, Brownsville & Mexico	454	....	454
St. Louis, Kennet & Southeastern	....	20	20
St. Louis Merchants' Bridge Terminal	9	....	9
St. Louis, Troy & Eastern	....	26	26
St. Louis Southwestern	629	....	629
Dallas Terminal	2	....	2
Eastern Texas	30	....	30
St. Louis Southwestern of Texas	695	....	695
Shreveport Bridge & Terminal	1	....	1
Paragould Southeastern	37	....	37
Pine Bluff, Arkansas River	24	....	24
Southern Illinois & Missouri Bridge	5	....	5
Stephenville, North & South Texas	105	....	105
St. Paul & Kansas City Short Line	120	....	120
Salem, Falls City & Western	....	27	27
St. Paul Bridge & Terminal	....	22	22
Salt Lake & Los Angeles	....	15	15
San Antonio & Aransas Pass	667	55	722
San Diego & Cuyamaca	25	....	25
Sandy River & Rangeley Lakes	....	78	78
San Pedro, Los Angeles & Salt Lake	1,113	....	1,113
Santa Fe, Prescott & Phoenix	364	6	364
Seaboard Air Line	1,938	1,132	3,070
Sibley, Lake Bisteneau Southern	....	28	28
Sierra & Mohawk	....	37	37
South Buffalo	....	7	7
South Georgia	....	77	77
Southern	6,916	123	7,039
Southern Illinois & Missouri Bridge	5	....	5
Southern Indiana & Chicago Southern	343	....	343
Southern Iowa Traction	....	24	24
Southern Michigan	....	35	35
Southern Pacific, Atlantic System:			
Arizona Eastern	331	184	371
Galveston, Harrisburg & San Antonio	1,247	77	1,336
Houston & Texas Central	771	....	771
Houston East & West Texas	191	....	191
Houston & Shreveport	40	....	40
Iberia & Vermilion	16	....	16
Louisiana Western	198	....	207
Morgan's Louisiana & Texas	367	....	398
Texas & New Orleans	435	16	459
Southern Pacific, Pacific System	5,370	713	6,083
South Georgia	....	77	77
Southwest Missouri	....	73	73
Spokane & British Columbia	....	36	36
Spokane & Inland Empire	170	....	170
Spokane, Portland & Seattle	392	150	542
Oregon Trunk	....	156	156
Stanley, Merrill & Phillips	....	32	32
Staten Island	13	4	13
Staten Island Rapid Transit	11	....	11
Sumpter Valley	....	81	81
Susquehanna & New York	47	47	47
Tennessee Central	289	....	289
Tallulah Falls	58	..	58
Tampa & Jacksonville	56	....	56
Tennessee & North Carolina	....	21	21
Terminal Railroad Association of St. Louis	9	....	9
Texas Mexican	160	....	160
Texas Central	308	....	308
Texas Midland	124	....	124
Texas, Oklahoma & Eastern	....	24	24
Tionesta	....	79	79
Toledo, Peoria & Western	220	3	220
Toledo, Port Clinton & Lakeside	....	53	53
Toledo, St. Louis & Western	450	....	450
Toledo Terminal	21	31	31
Tonopah & Goldfield	97	....	97
Tonopah & Tidewater	173	....	173
Tremont & Gulf	....	99	99
Tri-Sate Traction	....	8	8
Tuckerton	41	....	41
Tennessee & Cumberland River	....	15	15
Uintah	63	68	68
Ulster & Delaware	129	....	129
Unadilla Valley	....	19	19
Union & Glenn Springs	....	19	19
Union Pacific	2,768	606	3,374
Oregon Short Line	1,615	49	1,664
Oregon-Washington Railroad & Navigation	1,540	180	1,725
Oregon & Washington	195	113	250
Ilwaco	....	29	29
Corvallis & Eastern	119	19	140
Union Point & White Plains	....	12	12
United Verde & Pacific	26	26	26
Valley	....	11	11
Victoria, Fisher & Western	....	25	25
Virginia & Kentucky	....	5	5
Virginia & Southwestern	205	....	205
Virginia & Truckee	67	....	67
Virginia-Carolina	16	31	31
Virginian	....	468	468
Virginia Anthracite Coal & Ry. Co	....	10	10
Wabash	2,056	....	2,056
Wabash, Chester & Western	64	....	64
Wabash-Pittsburgh Terminal	3	61	64
Warren & Jamestown	....	22	22
Warren & Ouachita Valley	....	16	16
Washington, Baltimore & Annapolis	....	86	86
Washington Run	....	4	4
Washington Southern	....	32	32
Washington Terminal	21	....	21
Waterloo, Cedar Falls & Northern	20	26	26
Waynesburg & Washington	....	28	28
Weatherford, Mineral Wells & Northwestern	42	....	42
West Chester, Kennett & Wilmington	....	21	21
Western Maryland	543	....	543
Western Ohio	....	111	111
Western Ry. of Alabama	133	....	133
West Side Belt	....	21	21
West Virginia Northern	....	11	11
Wharton & Northern	....	20	20
Wheeling & Lake Erie	508	....	508
Wheeling Terminal	5	10	10
Wheeling Traction	....	20	20
Wichita Valley	255	....	255
Williamsport & North Branch	....	54	56
Wisconsin & Michigan	90	8	137
Wise Terminal	6	6	6
Woodstock	....	14	14
Worcester & Blackstone Valley	....	28	28
Worcester & Southbridge	....	58	58
Wrightsville & Tennile	108	....	108
Wyandotte & Southeastern	18	18	18
Total	169,400	58,584	224,283

Central of Georgia Adds Telephones

The Central of Georgia has recently placed an order, the second within six months, with the Western Electric Company for apparatus to be used in extending its telephone train dispatching system. In general, the equipment is to be the same as that furnished for the section of road recently so equipped from Columbus, Georgia, to Birmingham, Alabama.

At present there is a short section of road from Macon to Bolingbrook, Georgia, about fifteen miles in length, on which a seven-station telephone blocking system has been used. This line is to be converted and extended to Atlanta, a distance of about one hundred and five miles, as a selective telephone train dispatching system.

Seventeen way-stations will be equipped with Western Electric No. 102-B selector sets containing the well-known No. 50 type selector. Fifteen siding telephones of the No. 1317-W type will be installed in booths to be built along the right-of-way and every train operated on the division will carry a portable telephone set which may be connected to the line at any point in case of emergency, thus putting the conductor in touch immediately with headquarters.

The wire and hardware for the pole line are also to be furnished by the Western Electric.

Lehigh Valley Installs More Telephones

With the installation of the additional apparatus recently ordered from the Western Electric Company, the Lehigh Valley Railroad will have equipped all except about 150 miles of its entire system, including main lines and branches, with telephones for train dispatching. A further extension is now being planned.

The division to be equipped is the Elmira and Camden branch, extending over approximately 140 miles of road, wholly within New York state. The dispatcher is to be located in the middle of the line at Cortland, New York, and will handle both dispatching circuits, one of which goes to Elmira and the other to Camden. So that two calls may be placed simultaneously on either end of the line, individual calling apparatus is used for each circuit. Thirty-five way-stations are to be equipped with Western Electric standard No. 50-B selectors and auxiliary apparatus. Signaling and talking current will be furnished from the dispatcher's office by storage batteries charged by a one-kw. motor-generator set.

A feature of the Lehigh Valley's circuits is an automatic switch or inter-connecting arrangement which enables the dispatcher on any one division to communicate with the dispatcher on another. This furnishes a means of obtaining information about trains on other divisions before they arrive at divisional terminals.

Telephones for the East Carolina Railway

The ranks of the Southern railroads, which have adopted the telephone for train dispatching, have been swelled as a result of the East Carolina Railway Company's recent decision to use the most modern methods in handling the movements of its trains. In pursuance of this decision, an order for the necessary apparatus has been placed with the Western Electric Company, which has manufactured and supplied so much of the telephone equipment used by the railroads in the United States.

Ten way-stations are to be equipped with selective signaling apparatus. They will make use of the No. 102-A type selector set, which is equipped with the standard No. 50 type selector—a piece of apparatus which has attained nation-wide popularity as the most efficient and dependable instrument on the market. A large quantity of miscellaneous material is also to be furnished.

The telephone circuit will be about forty miles in length, extending from Tarboro to Hookerton, N. C. The dispatcher will be located at Hookerton.

British Telephone Men Courting Efficiency

Speaking at the recent annual dinner of members of the London Chamber of Commerce, the British postmaster-general, Mr. Samuel, said that during the last six months officers of the telephone department had, unknown to the operators, kept watch on a certain number of calls chosen entirely at random.

As a result of the investigations made it had been found that, in 50,000 calls, the average time occupied from the time of the ring to the time of the answer was 5.1 seconds, and that the average time in making a connection was 28.6 seconds, that is to say less that half a minute.

If these calls could be taken as typical of the whole, he thought the record was one of which his department had no reason to be ashamed. They did not intend, however, to leave matters at this, and within the last few days instructions had been sent to the officials of the department throughout the country which should have the effect of materially improving the public telephone service.

Mr. Samuel went on to announce that he proposed to spend this year a sum of £2,500,000 ($12,500,000) in developing the trunk system and the London and provincial systems. Steps were also being taken to introduce into the country automatic telephone exchanges, and it was hoped to equip two or three of the larger towns with these.

Telephones for Birmingham and Southeastern

The Birmingham & Southeastern Railway Company is another of the South's railroad systems to enter the ranks of those using the telephone for train dispatching. With this end in view, the road has recently placed an order with the Western Electric Company for the apparatus necessary to equip ten way-stations with selective signaling apparatus.

The selective apparatus to be used is the well-known Western Electric No. 102-B type selector set, operating with local battery, and equipped with the No. 50 type selector.

The telephone circuit is to be of No. 14 B & S gauge copper wire, and will be approximately forty-six miles in length, extending from Union Springs to Eclectic, Ala. The train dispatcher will be located at Union Springs.

The Italian telegraph and telephone department has commissioned the Bell Telephone Manufacturing Company, of Antwerp, to extend the telephone exchange at Rome, equipped by that firm some years ago. Since the taking over of the telephone service by the state, the Bell Company has equipped not only the exchange at Rome, but those at Milan, Naples, Catania, Genoa and Turin.

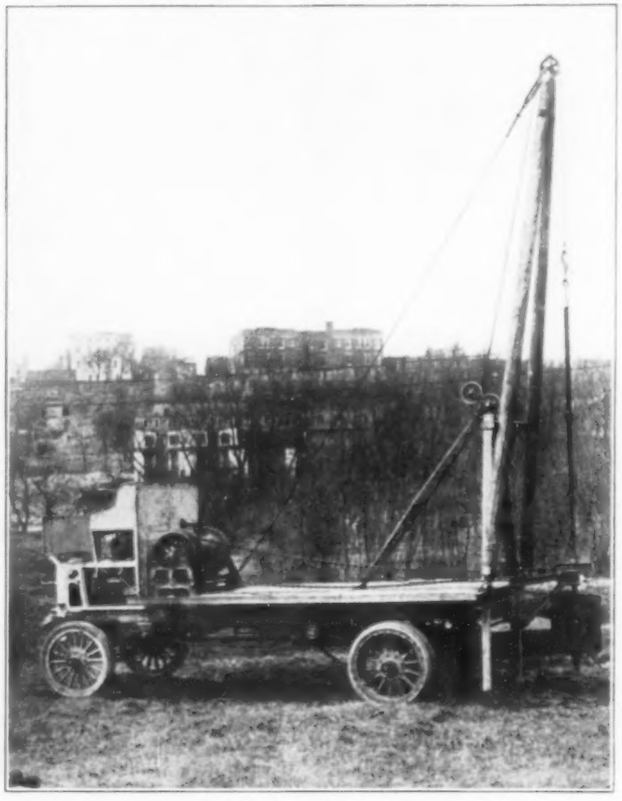
Of Interest to the Trade

By A. L. Haase

Mack Post Hole Digger and Derrick

The International Motor Company has just put on the market a very interesting post hole digger and derrick which is one of the most unique applications of the motor truck so far made. Briefly, the post hole digger and derrick consists of a three-ton Mack chassis which is backed up to the curb or wherever the telephone, telegraph or electric transmission line is to be constructed, and in ten minutes or less, with the use of its engine or power and the special devised derrick and drilling apparatus, digs a hole seven feet deep and then with the power of the engine hoists the largest and heaviest pole and lowers it into the hole.

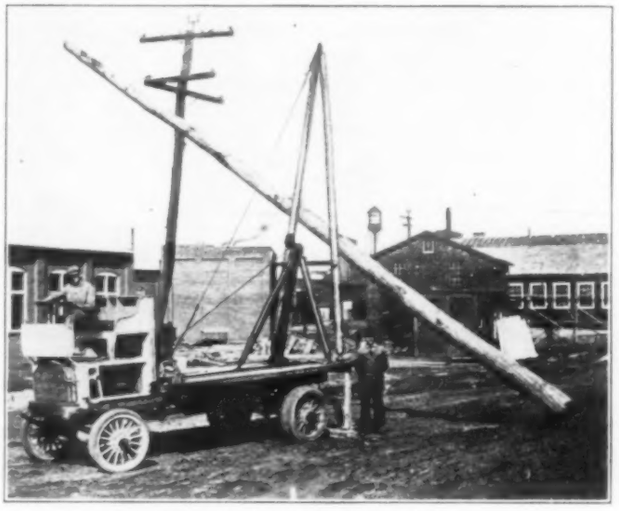
The truck is, as stated, the standard three-ton type, such as International Motor Company has supplied in large numbers to the associated Bell telephone companies throughout the country. The platform of the rear of the truck is reinforced with heavy high beams and over the rear end of the truck is erected a boom. This boom supports the drilling apparatus, which is a modified carpenter's expansion drill. The drill is about one foot long and has a disc shaped plate with tooth cutting edge



Removing Dirt Automatically with Power Winch.

which throws up the earth as the drill bores into it. This disc, also as will be noted in the figure, supports the core of loose earth, and at a signal to the driver of the truck the drill can be raised and drawn from the hole by a cable attached to a standard which is operated by truck motor.

After the hole has been drilled and the dirt removed, the chain is fastened about the pole to be set and in a jiffy the pole is hoisted and dropped into the hole that has been dug, as shown.



Lifting Pole with Butt Over Hole.

The money saving possibilities of the Mack post hole digger and derrick can be fairly imagined from the fact that two men working together can dig about four post holes in a day and that it takes a very considerable gang of men, after the holes are dug, to set the poles and tamp the earth around. The Mack post hole digger and derrick can haul the poles to the spot selected, dig the holes and then set the poles. Not only is it a money saver, but it is possible to set many more poles in a given time than by the ordinary construction method.

The Mack post hole digger and derrick is the result of many months of thorough tests and experiments before the apparatus was offered in commercialized shape. In a recent test witnessed by James Cunningham and E. C. Spey of the engineering department of the Bell Telephone Company of Philadelphia, demonstration was made at the instigation of these managers to test the digging capabilities of the truck in all kinds of soil, including the toughest kinds of clay. The post hole digger and derrick met every test required of it and this digger has been sanctioned by the engineering department of the Bell Telephone Company of Philadelphia, and it is expected that it will find a large field of application in the future in telephone and electrical line construction service.

A splendid example of catalogue making is the Corwin Telephone Manufacturing Company's book of telephone systems, apparatus and supplies. It constitutes the first issue of a perpetual catalogue for which additional sections will be furnished by the company from time to time. Besides the listing of supplies much useful information is given in convenient form.

The Four "R"s

The telephone, which, after all, is only thirty-six years old and has undergone its remarkable development in that comparatively short space of time, has probably become a greater boon to the farmer than to anyone else. Before the advent of the telephone, the great drawbacks to country life had been its isolation, its meager opportunities for social intercourse, and still fewer facilities for protection of home and property. Worse still, trading and selling could only be done at a disadvantage owing to the lack of up-to-the-minute knowledge of market conditions.

Today it is the American farmer who holds the center of the commercial stage, and it is probably not too much to say that the wonderful little instruments for instantaneous communication have done more than anything else to revolutionize commercial life.

Why should not the farmer have all the conveniences of his city cousins?

The annual report of the Department of Agriculture indicates that a sum of money, so large that the average mind will not readily grasp its meaning, is in the control of the farmers of our country. That, if nothing else, proves that the modern farmer has expanded into a commercialist—a man of the twentieth century! He accomplishes more than the old-time farmer did, although he does not actually work harder nor longer. He merely does his work in a better, and, although he may not realize it, more scientific way. He makes use of the four "R" 's—Reading 'Riting, 'Rithmetic and Rural telephones.

The rural telephone movement has gone forward by leaps and bounds. The Western Electric Company, it reports that during the last three years it has furnished over a quarter of a million telephones for farmers' use. Truly this is the age of progress!

Western Electric's Business in April

Total of goods billed out during April by the Western Electric Company shows the surprising increase of 17 per cent over the total for April, 1911. Last month's gain slightly more than offset the falling off shown by the first two months of this calendar year. March ran about even with the preceding March, so that the first four months of 1912 are about 1½ per cent ahead of the same four months in 1911.

April's gain is looked upon by the company's officials as somewhat extra-normal and due to several special conditions. It indicates an increase in the year's total business which later months, it is believed, will not sustain. Those close to the company say that if 1912 shows as good business as last year, when sales totaled $66,000,000, they will be well satisfied with the result.

The gain last month came chiefly from the east and the far west sections of the country. The middle west was somewhat behind, reflecting the cold weather and late spring. Later it is expected that the middle west will make the lost ground, provided crop developments continue satisfactory.

This is the busy season of the year for the Western Electric Company. The telephone, electric light and power companies are overhauling their plants and going ahead with extensions and improvements. The months of April, May and June usually see the largest volume of goods billed. Foreign business was also an important contributing factor to the April improvement.

Western Electric is contemplating no construction work of importance. The Hawthorne plants are completed and the company has sufficient facilities to care for the present volume of trade and considerable in addition. Number of employees continues about the same as a month ago.

Improvement in Screw Anchors

An improvement in one-part screw anchors has been placed on the market by the Diamond Expansion Bolt Company, 90 West street, New York, known as "Diamond N" screw anchor.

The regular pattern has been used for years with perfect satisfaction in making all kinds of attachments in various lines of trade requiring expansion bolts, and it is found that the new "Diamond N" screw anchor, while containing all the good qualities of the regular

Improved Screw Anchor in Use.

pattern, has added advantages in greatly increased holding capacity and greater convenience in use.

The transverse ribs at the inner end of the shield give a uniform and secure bearing and grip into the fiber of the material to which it is fastened, presenting a greater surface of contact than was formerly the case with the series of Diamond points.

The longitudinal ribs at the outer end of the shield are placed there to bind in the wall with a driving fit when the screw is inserted. These ribs are for the purpose of preventing the shield from turning when the screw is being turned into it.

The maximum expansion being at the inner end gives a very powerful hold, and has in many test cases pulled out a section of the wall in extracting it from the hole.

Electricity—The Servant in the House

A great deal has been said and written about the electrical home of the future; but it has remained for the Western Electric Company to point out, in a recently published booklet, entitled, "Western Electric Household Helps," that the electrical home is a thing of the present.

The booklet is a most attractive one and, being dedicated to the "American Woman," it has been the aim to produce something which would appeal to the housewife by virtue of its delicate appearance and engagingly written subject matter. The finished publication is evidence that this aim has been achieved. The book-

let shows conclusively that with electricity in the home, the much-dreaded housework and house cleaning may be shorn of their terrors. Such devices as electric irons, electric toasters, chafing dishes and percolators, electric warming pads, electrically operated vacuum cleaners and washing machines and electric motors for sewing machines, make life infinitely easier for the modern housewife. For beautifying the home, there are Sunbeam Mazda lamps and Mazdaliers and portable lamps; for saving stairs, there are Inter-phones, and for keeping the house cool, fans.

The little book is well worth reading. Copies will be furnished on request by the company.

Standards of Copper Wire

The Bureau of Standards, Department of Commerce and Labor, has recently made a report on copper wire tables in which it states that copper wire tables are based on cerain standard or assumed values for the conductivity or resistivity and the temperature coefficient of resistance of copper. The electrical engineer does not consult the wire table when accuracy is required, but makes actual measurements of the resistivity of samples of the copper used. Often the conductivity which results is shown in per cent of the standard value assumed for conductivity. As the same standard value is not in use everywhere, confusion has resulted in the expression of per cent conductivity, for per cent conductivity is meaningless without a knowledge of the standard value assumed, unless the same standard value maintains everywhere.

Some fixed standard value is usually assumed for the temperature coefficient of resistance, but the same standard value does not prevail everywhere, and when the temperature coefficient assumed was not stated results reduced from one temperature to another have been uncertain. Owing to these conditions the American Institute of Electrical Engineers requested the Bureau of Standards to investigate the subject, which has been done, resulting in the establishment of standard values based on measurements of a large number of representative samples of commercial copper. In many respects these values are more satisfactory than any former standard values.

Among the things brought out in the investigation was the fact that the temperature coefficient is proportional to the conductivity, which law has been confirmed by Reichsanstalt, of Germany, and is considered quite important in electrical measurements. It was also brought out that the temperature coefficient is not changed by bending and winding a wire, therefore the internal temperature of electrical machinery may be calculated from resistance measurements with greater assurance than ever before.

Germany has preferred a standard conductivity based upon this investigation, which has been accepted and doubtless will soon be adopted all over the world. The new standard is a somewhat lower conductivity than the previous American value and the average of the experimental values published by the Bureau of Standards, but may be regarded as fairly representative of average commercial copper.

The report also includes a history of wire gages in which it is shown that the inclination is to express diameters directly in decimal fractions of an inch. There are fifteen tables in all, including complete reference and working tables for annealed copper, in both English and metric units, and for copper cables and hard-drawn aluminum wire, The American Institute of Electrical Engineers has adopted these tables as its official wire tables.

New Jersey Commission News

The law firm of Gaskill & Gaskill, representing Camden business interests, May 8, filed with the New Jersey Public Utility Commission at Trenton a brief upon the petition that the commission order the Delaware and Atlantic Telegraph and Telephone Company to give telephone service to Camden subscribers at "reasonable" rates.

The fight, which was started when the Bell Company raised rates in Camden, has assumed such proportions that the Bell interests have brought their best legal talent into use.

The argument of the petitioners fills thirty-nine typewritten pages. The following shows the salient features of the argument:

The complaint filed by the petitioners charged that the telephone company has unjustly and unreasonably increased its rates, tolls, charges and schedules thereof applicable to users of its service in Camden, and has changed and altered the classifications of service which were outstanding at the time of the passage of the public utility act.

Under this complaint, the telephone company submitted testimony and table of figures in an endeavor to support the rates, tolls, charges and schedules then and now in force.

The attack of the petitioners upon the position of the telephone company rests mainly upon three grounds:

1. The cost of reproduction new now is not the proper basis and is not the sole basis for determining the value to be accepted by the commission in fixing rates; nor is the tabulation of figures setting fortn the cost of production new now correct and acceptable as the basis for the use of the commission.

2. The charge for depreciation upon which the company has operated in the past, and upon which it relies at present, is improper and unjust, as it includes not only charges for true depreciation arising from wear and tear, decay and old age, but also the replacement of plant due to causes arising from obsolescence, inadequacy, replacement under municipal regulations, and removal from leased quarters. That the company must be required to establish a depreciation reserve to provide for true depreciation, and pay for replacement arising out of the obsolescence, etc., out of its capital account.

3. That the present management is wasteful and extravagant in the extreme, and is so organized as to divert the profits of the business to the American Telegraph and Telephone Company and deprive the subscribers for service of any opportunity for reasonable rates, or other benefits due them.

The telephone company has three weeks in which to prepare and file an answer to the petitioners' brief. Oral argument will then be heard by the Public Utility Commission and a decision will be rendered later.

Influence of Telephone Lines Upon Lightning

An inquiry conducted by Mr. Langbuck in Prussia leads him to the conclusion that within recent times there has been a remarkable decrease in the number of accidents due to lightning in certain cities, says Cosmos. He attributes this effect to the extended development of aerial telephone lines, and concludes that inasmuch as at present the practice of laying underground telephone lines is becoming more and more prevalent, we must expect an increase in the number of strokes of lightning.

Public Ownership Scandal in Winnipeg

Three years ago Manitoba, Canada took over all the telephone systems in the province. Now a royal commission is trying industriously to discover why it is necessary to boost rates of telephone service to such a high figure that the entire province is in a turmoil.

The subject has grown so large that the provincial parliament spent half the time of the late session debating the matter, which has become the leading issue in the province. Already there has been one man arrested in connection with the investigation and one or two others, formerly connected with the public telephone system, have left the province for the good of the state.

The service has degenerated into a laughing stock for those foreigners who are accustomed to something better, and the threatened increase in rates raised such a "howl" that the government has not put it into effect, but has suspended it temporarily.

The Winnipeg industrial bureau and the Winnipeg board of trade have appointed committees to investigate and parliament recently had under discussion the question of placing the surplus of the provincial government at the disposal of the government commission that the deficit in telephone affairs might be overcome. The royal commission of investigation has been at work since early in February. It is holding sessions throughout the province and at each town is turning up masses of corruption, incompetency and graft.

If ever a state-owned public service concern had an opportunity to "make good," it was the Manitoba telephone system. The commission had the powers of a commanding general on a field of battle. According to testimony given by Commissioner Paterson, the government never has, since the plant was acquired, questioned the expenditure of a single cent. The amount expended by the telephone commission did not depend on the receipts at all. The receipts went to the government, and the government had nothing whatever to say as to the manner in which the appropriated cash was spent. The government furnished all the money the commission demanded, testified Commissioner Paterson. "Sometimes," said the same authority, "the commission purchased $500,000 more materials than were necessary."

So the commission continued operating all the telephones in the province. The plants depreciated something like six per cent annually, but at the rates charged, said Paterson, no surplus to care for this depreciation could be set aside.

With British faith in state-ownership, Winnipeg bragged of its telephone system. The people owned the plant and they could put up with somewhat inferior service "temporarily." But instead of improving, it got worse. Then, like a thunderbolt came the announcement that the rates must be raised; that the plant could not continue operations on the present scale of rates.

Damper to Reduce Telephone Disturbance

According to *Tekinsk Tidsskrift,* a Swedish engineer, Mr. Saxenberg has invented an apparatus to prevent, or, at all events reduce buzzing and all similar extraneous noise in telephones. The apparatus is very simple, consisting of a kind of adjustable leak resistance for extra currents on the line in the shape of two columns of water which are connected with each other and the earth at one end while the other ends are bridged across the telephone wires. One of these devices is to be inserted at each end of the line, near the telephone apparatus, so as to enable the user of the telephone to reach it, and, by adjusting one or the other electrodes up or down, to cause the buzzing to disappear. By means of its resistance, which is non-inductive, the damper conducts to earth all static charges or induced currents, which take this path in preference to the inductive circuit through the telephone. At the same time, it gives an excellent protection against discharges of electricity from the atmosphere. As both the electrodes can be regulated and the resistances at the poles can thus be varied quite independently of each other, it also becomes possible to compensate for various leakages which may occur in the line. The leakage and the induction vary according to the weather and the atmospheric conditions, and a readjustment of the apparatus accordingly is often necessary so as to obtain the greatest possible "buzz-damping" effect. It is therefore recommended, as mentioned above, to place the apparatus in such a position as to render it easily accessible.

The apparatus has been tested on the line Vesteraas-Traangfors, which was previously nearly useless, and the improvement was astonishing. Previously attempts had been made to obtain the same effect by the installation of an inductance coil between the wires, the center of which was connected with earth. But such an apparatus has the great disadvantage of offering an inductive resistance, and apart from this there is this drawback, that the two portions are not adjustable in respect of their mutual relation. It therefore does not stand any chance as compared with the adjustable "buzz-damping" apparatus, which is non-inductive, and which is applicable as a remedy against all kinds of ordinary disturbances that are likely to take place. The apparatus has been put on the market by the Allmäna Svenska Elektriska.

Corrosion of Iron and Steel

At a joint meeting in Milwaukee, Wis., of the Milwaukee section of the A. I. E. E., the Milwaukee section of the American Chemical Society and the Milwaukee Engineers Society, Prof. C. F. Burgess of the University of Wisconsin gave a very interesting talk on the corrosion of iron and steel. After reviewing the several theories that have been advanced regarding the corrosion of iron, Prof. Burgess outlined his own theory, which is based on the electrolytic action between different parts of the iron having different density. In the presence of moisture these particles of varying density and composition form electrolytic cells which start the corrosion.

Several lantern slides of samples showed the corrosion effect, and laboratory apparatus was exhibited which duplicated this corrosion on a larger scale. The speaker also touched briefly on the influence of protective coatings, such as the Sherardizing process, which he stated was the formation of an alloy between the protective metal and the iron. It was also pointed out that impurities, such as the addition of other metals to the iron, have sometimes a retarding influence upon the corrosion, but in most cases the protective material has to be added in such large quantities as to make the process uncommercial. This seems to be in direct contradiction to the electrolytic theory and therefore a very broad field is still open for investigation upon this subject.

During the discussion the influence of impurities,

such as copper and nickel, added to the iron for protection against corrosion, was discussed more in detail, also the influence of protective coating, which, it was pointed out, would be valuable only as long as the coating could be kept on the rion. In many cases this is very difficult, such as on pipes which are buried in the ground and which are in great danger of corrosion on account of their being also subjected to the electrolytic action of stray currents from railroads and lighting networks. It was suggested that the laying of pipes in a wooden duct filled with tar or asphalt would be the best protection, but under modern conditions where city streets are crowded to their capacity with pipes and cables this method is not practicable, except in rare cases where the importance of the installation warrants the high cost.

A Deaf-Mute Telephone

John F. Norris, a deaf mute electrical engineer of Atlanta, Ga., has perfected a deaf mute telephone, and it is claimed deaf and dumb people will no longer be handicapped by not being able to use a telephone.

The inventor says that the deaf mute telephone will work accurately and quickly at all times. Messages from one deaf mute to another, or from an unafflicted person to a deaf person, can be delivered without any writing or signals.

Mr. Norris' invention is in reality a telegraph system, controlled by lights instead of sounds. Letters and numerals are placed on boards at each station, and beneath is another board with the alphabet and numeral push buttons. The first is used for receiving and the second for communicating. Seventy wires are necessary to transmit message, and these wires are contained in a cable into every house.

To communicate a button is pushed, and a large lamp glows. A second signal tells when the desired person is at the phone. Then by means of boards the conversation is transmitted. The invention, thinks Mr. Norris, will be rather expensive, but thoroughly practicable.

Getting Business by Long Distance Telephone

One afternoon important information came to the New York newspapers. It was necessary to get the views of a prominent corporation official. Reporters hurried to his office. He would not see them. They followed him home but with the same result. Only a single newspaper printed his views next morning, and that was a journal whose editor had his Pittsburgh correspondent call up the official by long distance telephone. When word was brought that long distance wanted him he got out of bed, and the dignity of the approach was such that he talked freely.

In these days, competition is keen. Methods of approaching people must be carefully considered. The mails are padded with circulars and imitation letters Signs and hand bills follow the average man on the street. The best salesman doesn't always get an interview. People are expert in dodging.

But everybody is always "at home" to the long distance telephone.

It is a means of approach that has never been overdone. It always implies business of importance. The man who has something to sell bestows a compliment upon his potential customers by using it. Even the most tactful personal letter may be regarded as an intrusion, but never the toll call. The party calling is there in person on the other end of the wire, able to talk, give full explanations, and manage every detail of the conversation in a skillful way.

Assume that there are half a dozen customers scattered over territory 10 or 20 miles from the office, but conveniently reached by trolly lines. It will take a salesman fully half a day to visit them, and there is the cost of his time, car fares and expenses.

Every customer who happens to be out or too busy to talk, costs just as much pro rata as those who were successfully interviewed. Place these six customers the same distance in the country, off trolly lines, where a team or motor must be used for traveling. The cost of visiting them will easily be doubled, and there are whole months in the year when the state of country roads makes it impossible to keep in touch with such trade.

In canvassing trade of this character, the business man must go largely by the cost. Very often there are small customers he would like to work frequently through his sale force, but the cost is prohibitive, or pressure of other matters prevents.

Now, with the long distance, practically every customer of this sort can be reached at the mere expense of trolly fares. The salesman can cover a whole outlying region in two hours. The directness and efficiency of the canvass are as great as in a personal visit.

The extent to which the telephone may be used to increase sales, says *System* in a recent issue, is limited only by the salesmen's ability to originate and apply schemes for getting customers into the habit of ordering goods by that method. Few business concerns, large or small, can afford to neglect the possibilities afforded by the telephone for keeping in communication with their customers. One great store in Philadelphia, at a conservative estimate, credits at least half of its 25 per cent increase of business during 1911 to a persistent compaign for telephone orders.

Every letter written in a business house costs somewhere between 20 and 50 cents. This may seem a bit startling, for ideas on correspondence costs are pretty generally bound up with the two-cent stamp. But if the items of stationary, postage, stenographer's time, filing copies, principal's time and so forth are faithfully set down, it will be found that business correspondence costs a good deal more than most people imagine. The cost of sending out the simplest sealed printed circular to a list of several hundred of prospects is about five cents per piece.

Add to this "manufacturing cost" the delay of correspondence and the valuable time of a busy man taken from more profitable work, and it becomes well worth while to weigh each letter against the telephone service and decide whether a long distance message would not be cheaper than writing. If the inquirer is anywhere within 500 miles, it is usually possible to talk with him by telephone. Investigation of the mail that comes into the average office will show that he probably is within this speaking distance, for about three-fourths of a business mail comes from within a much smaller radius. If he wants to know something about prices or goods, there will usually be two or three letters in all, and the matter will be strung out a week or two. Very likely he is in correspondence with other houses on the same subject, so that there will be competition to see who can give him the best explanations and do it the quickest. On the whole, the business is going to hang in the balance for a

considerable period and the man who writes him letters is dealing at a distance, and at a disadvantage.

By long distance telephone it is possible to talk with him directly at once, while the matter is fresh in his mind. Long distance will get to him before a letter. It will get there before competitors' letters. If some competitor has the forethought to send a salesman to see the inquirer, it will get there before him. The cost will be lower than correspondence, in the end. If there is a chance to land the business, it will give the best chance, and if the business cannot be landed, the matter is definitely settled, saving time, delay and lost energy.

When sales are made over the telephone by a corps of salesmen, it is well to have them trained carefully for that work. A department store in the West recently issued the following leaflet of instructions:

"An employee should be ready to talk to the customer as soon as the connection is completed. Get the name, address and telephone number of the calling person as early as convenient in the conversation. Speak in a moderate tone directly into the transmitter with lips close to the mouthpiece. When the telephone rings, answer promptly with the name of your department. Avoid the word "well," "hello," or "what is it?" Be quick and to the point. Finish every conversation you start. Never fail to say, "Is there anything else, or another department to which I may transfer you?" Never evade a complaint. Show real regret that there has been a cause for complaint—genuine pleasure in correcting it. We want everyone in this store family to regard the telephone as a help and a means of his or her development. It will pay you as well as it does the store."

Many devices have been used to attract telephone business. The April issue of *System* gives several. Among them are: 1st, "Printing a catalogue showing the picture of the operator who takes the customer's telephone order in any particular department (thus establishing the "personal relation"); 2nd, the dealer having his name placed in several classifications in those directories which publish such classifications; 3rd, giving checks for free telephone calls to customers who make purchases of over 25 cents, or some such amount; 4th, giving prizes to customers who ordered goods by telephone at a certain secret but prearranged moment; 5th, giving rebate on goods ordered by telephone; 6th, using telephone or telephone equipment in store windows for display purposes; and so forth.

Another retail establishment inaugurated an apparently expensive "free toll service." This service was announced by an explanatory advertising campaign. Twenty-five thousand people in suburban towns were given the privilege of calling this store by telephone free of charge, either to place an order or to inquire about goods. Anyone whose name was listed in the local telephone directory was placed on the firm's credit list. Customers who lived in suburban towns were invited to use the store's telephones to call their homes while they were in the store—also free of charge. This is undoubtedly one of the broadest and most liberal telephone policies now practiced in department stores. But more than one store has found it profitable.

Every executive knows the sort of sale that is all made but the "closing," and yet hangs fire. How often, when trying to show subordinates how to land the order, he has wished that he could get direct action himself on the customer for five minutes.

There is a manufacturer in the Middle West whose salesmen visit prospective customers. Explain goods, maintain interest. But if the deal is important he usually has to go and wind it up in person.

"I'm not what you'd call a salesman," he says. "Yet when our men have been calling on Jones three months, and Jones has gone into every blessed point, and is still sitting on the fence, I find the best thing is to get my hat, and go and see him, and ask him why he's holding off.

Maybe he says, "Why, I want to figure out that cost again."

"Cost!" I say. "What cost? This equipment isn't going to cost you anything. Good heavens, man, the savings on the first six months' operation will pay for the whole thing!"

"I don't pretend to be a salesman. But when I make up my mind to close Jones, and go at him like that, he most generally always signs up."

Today, this manufacturer is "closing Jones" over the long distance telephone. In dealing with customers he formerly reached nearby, it saves his time and theirs too, and he is able to bring in territory far beyond what was possible in the days when he reached for his hat instead of the telephone receiver. The telephone saves Jones's time too. The door is never shut, and for direct effect it is every bit as potent as a personal visit.

"The Road to Profit," a booklet just published by the Indiana Steel and Wire Company, Muncie, Ind., is introduced with the aphorism that "The success or failure of a telephone plant depends immeasurably upon its lines." The various subjects taken up in turn by the booklet are "Plant Equipment," "Transmission Fallacies vs. Facts," "Properties of Testing Telephone Wire," "Comparative Carrying Propensities of E. B. B., B. B. and Steel," "Mechanical Requirements," "Electrical Requirements," "Galvanizing," "Comparative Difference in the Life of E. B. B., B. B. and Steel Wire," "Formula for Testing Galvanization," and "The Manufacturing Side." Everyone who uses telephone wire should have a copy of the booklet. The company will send it free.

About June 1 Marburg Brothers, Inc., move to their new quarters in the U. S. Rubber building at Fifty-eighth street and Broadway, New York City. This firm is well known as the importer and agent for the Mea magneto and S R O ball bearings in this country and Canada, and has a local office in Chicago, at 215 East Twenty-first street, in charge of E. C. Cheney.

Matthews Catalogue No. 8 (W. N. Matthews and Brothers, St. Louis, Mo.) is bigger than most of the former literature of that house, and correspondingly more valuable. The usual system of giving all kinds of telephone information is still followed, so that the "catalogue" generally finds a place in the book case for ready reference, instead of in the files.

Catalogue No. 1 of the Fahnestock spring binding post has been issued, and shows the many uses to which this little device may be put in electrical work of all kinds.

"Storage Battery Railway Cars" is the title of the Electric Storage Battery Company's bulletin No. 136, just out. It contains a lot of valuable information for those interested in the subject.

Brevities of the Business

PERSONAL NOTES.

Samuel G. McMeen, of the firm of McMeen & Miller, Chicago, has been elected president of the Columbus Railway and Light Company, Columbus, Ohio, an organization which operates the Columbus Light, Heat and Power Company, the Columbus Traction Company and the Columbus Railway Company. For a number of years after leaving Purdue University, Mr. McMeen served in various capacities in the operating, construction and engineering departments of the Central Union Telephone Company, a portion of the time in the company's headquarters in Chicago and a portion of the time in the field in the states of Ohio, Indiana, Illinois and Iowa. Later he entered the employ of the Western Electric Company, being in charge of telephone exchanges and equipment. In 1904, in connection with Kempster B. Miller, the firm of McMeen & Miller was opened in Chicago, since which time he has been connected with some very important engineering feats, among which was an exhaustive study of telephonic conditions of the city of Mexico and complete plans for extensive underground conduit and cable systems there. More recently he was engaged in similar important undertakings on the Pacific Coast, where, owing to his thorough understanding of the details of transmission lines and the workings of public-utility corporations, he was chosen president of the Mount Hood Railway and Power Company, Portland, Oregon. The new connection is a promotion from this position. He still retains his connection with the firm of McMeen & Miller.

W. D. Weaver, for the past nineteen years editor of the *Electrical World*, New York, has retired from the editorship of that publication to engage in other pursuits. He still retains, however, the honorary title of consulting editor.

W. H. Howell, formerly assistant manager of the East Tennessee Telephone Company's exchange at Paducah, Ky., has been promoted to the position of manager, succeeding L. L. Billups who has been made district commercial manager.

F. K. Best has been appointed manager of the Federal Telephone and Telegraph Company's exchange at Geneva, N. Y., succeeding S. A. Lane who has been promoted to the position of general manager of the Niagara County Home Telephone Company, Niagara Falls, recently vacated by R. Max Eaton.

C. J. Benjamin has taken up the position of manager of the Federal Telephone Company at Holly, N. Y.

Owen D. Harrison has been appointed manager of the Northern Illinois Telephone Company at Earlville, Ill.

Pearl Vandeventer has been appointed local manager of the Lincoln Telephone and Telegraph Company's exchange at Louisville, Nebraska.

Alexander Graham Bell has accepted the editorship of the *Volta Review*, Washington, D. C., a publication issued by the American Association to Promote the Teaching of Speech to the Deaf, which organization was founded by Mr. Bell.

Washington A. Roebling, son of C. G. Roebling, president of the John A. Roebling's Sons Company, was one of the unfortunate victims of the Titanic disaster.

H. F. Patterson, Jr., has resigned his position as district commercial manager for the Southwestern Telephone Company, Corpus Christi, Tex., to connect himself with the Bell Telephone Company, with headquarters at Philadelphia, Pa.

J. G. Ihmsen has returned to the telephone business. He was general manager of the American Electric Telephone Company, Chicago, for many years, leaving to become manager of the Reliance Elevator Company, Chicago. May 15 he assumed the duties of general manager of the Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y. Few men are better known to the telephone trade than the genial and courteous George Ihmsen, and it is good to have him back in the game.

Gilbert Gislasen has been appointed manager of the cost department of the Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y. He formerly held a similar position with the American Electric Telephone Company, Chicago, going from there to the Hawthorne plant of the Western Electric Company, where he had charge of telephone switchboard cost calculations. He goes to Rochester at the request of Superintendent H. P. Clausen, who was formerly chief engineer of the American Electric Telephone Company.

J. F. Henderson, Fort Worth, Texas, has been promoted from the position of division commercial superintendent of the Southwestern Telephone and Telegraph Company to that of representative of vice-president and general manager.

J. P. Parrish, Winchester, Ky., has been appointed manager of the Cumberland Telephone and Telegraph Company's exchange at Shelbyville, Ky., succeeding C. E. Norton, who has been promoted to the position of manager of the district composed of Shelby, Spencer, Henry, Oldham, Trimble and Carroll counties.

Vernon Baird, for the past three years in charge of the Cumberland Telephone and Telegraph Company's exchange at Covington, La., as district and local manager, has been promoted to the management of the company's exchange at Lake Charles.

Effective May 1 a number of changes were made in the district staff of the British Columbia Telephone Company. H. J. O'Keefe, acting manager for the company at Nelson, B. C., became superintendent of the Kootenai and Boundary districts, H. A. Nicholson, manager at Grand Forks was transferred to Roseland and was succeeded at the former place by J. Sowerby of Vancouver. J. Fitzhugh of Vancouver became manager at Greenwood.

John H. Ainsworth, general manager of the Home Telephone Company, Dayton, Ohio, for the past five years, has been appointed to represent the Automatic Electric Company of Chicago, in the state of Ohio, with headquarters at Columbus. Mr. Ainsworth began his telephonic career as night operator with the Central Union Telephone Company, Ironton, Ohio, 1888, advancing from one position to another, eventually becoming district manager for Zanesville and five counties and acting superintendent, with headquarters at Zanesville.

Lester F. Ellis is the new manager of the Aroostook Telephone Company, Houlton, Maine.

White Yearwood has been appointed manager of the Cumberland Telephone and Telegraph Company, Murfreesboro, Tenn., succeeding W. C. Anderson, who has been promoted to the management of the company's exchange at Hopkinsville, Ky.

Dr. Frank J. Jewett, transmission and protection engineer of the American Telephone and Telegraph Company, with headquarters in New York, has assumed the position of assistant chief engineer of the Western Electric Company. Dr. Jewett has been succeeded by Elam Miller, his assistant since the first of the year, but formerly commercial engineer on the Pacific Coast for the Pacific Telephone and Telegraph Company.

J. F. Van Vore, formerly manager and superintendent of the Dubuque Telephone Company, has been appointed district plant manager for the Iowa Telephone Company.

E. H. Garratt has been appointed manager of the district recently formed by the Cumberland Telephone and Telegraph Company, comprised of Butler, Simpson, Logan, Warren, Todd, Christian, Caldwell and Trigg counties, Kentucky, with Hopkinsville as headquarters. W. A. Anderson has been appointed plant chief. Mr. Garrett will superintend the commercial business of the company and Mr. Anderson will give his attention to the twenty-one Cumberland exchanges already in operation in the territory. It is the purpose of the new plans to systematize the business of the company in this section.

J. P. Turner, Humboldt, Tenn., who for years has had charge of the commercial and plant departments of the Humboldt, Milan, Gibson and Medina exchanges of the Cumberland Telephone Company has been placed in charge of the commercial department and E. S. Danner in charge of the plant department, the two departments being conducted separately henceforth.

Samuel Yongue Caldwell, who has been in the employ of the Cumberland Telephone Company since 1901, serving that company in various capacities, has been appointed division auditor of the Savannah Division of the Southern Bell Telephone and Telegraph Company.

B. K. Rawlings was recently elected president of the Cecil Farmers' Telephone Company, Rising Sun, Md., at the annual stockholders' meeting. Reports showed the net earnings for the fiscal year to have been over 14 per cent and the directors declared a dividend of 6 per cent payable July 20.

C. E. McDonald, lineman for the Wisconsin Telephone Company at Beloit, Wis., has been promoted to manager of the company's exchange at Shullsburg.

A. J. Beadles, Union City, Ky., has been appointed manager of the Cumberland Telephone and Telegraph Company's exchange at Hickman, Ky., succeeding D. Owens, resigned.

J. S. Moon has been appointed manager of the Acme Telephone Manufacturing Company, Albia, Iowa, and will devote his entire efforts to forwarding the interests of the company.

O. T. Pickard, assistant general manager of the Cumberland Telephone and Telegraph Company's Memphis office, has been promoted to the position of district manager with headquarters at McKenzie, Tenn., where he will have charge of about twenty-five exchanges in that vicinity.

Peter Shea, who has been in the employ of the Wisconsin Telephone Company at De Pere, Wis., for the past five years, the last two years as wire chief and repair man, has been promoted to the position of manager of the De Pere exchange, succeeding J. G. McEniry, who has also been promoted to a more important position with the company.

John D. Lowenstein has been appointed manager of the Independent Telephone Company, Kearney, Nebr., succeeding Ed. E. Piper, who has accepted the position of special salesman with the Dean Electric Company.

Because of the taking over of the Bell Telephone and New Home Telephone companies at Beatrice, Nebraska, by the Lincoln Telephone and Telegraph Company, W. H. Caman, for a number of years local manager of the New Home company becomes district commercial superintendent and is succeeded as local manager by E. C. Salisbury, who has been district manager for the Bell company. Miss Laura Younkin has been appointed chief operator. Later on the two companies will be consolidated.

A. M. Fishburn, of Biloxi, Miss., has been transferred to Gulfport as commercial traffic manager of the Cumberland Telephone and Telegraph Company.

J. B. Ware, so well known in the telephone field, has resigned as a director of the Citizens' Telephone Company of Grand Rapids and will remove to Ashland, Oregon, to engage in the lumber business.

On the eve of his departure for St. Louis, J. P. Crowley, secretary of the Southwestern Telegraph and Telephone Company, who goes to St. Louis for the Southwestern system, was guest of honor at a dinner given at the Oriental Hotel, Dallas, Texas, by old employees at which Vice-President and General Manager Joseph E. Farnsworth was toastmaster.

F. Douglas Watson, general manager and secretary of the Constantinople Telephone Company (Societe Anonyme Ottomane des Telephones de Constantinople) left London April 15 for Constantinople. A. S. Duncan and A. Podmore, of the National Telephone Company's engineering staff, whose appointment as assistant electrician and assistant engineer, respectively, of the Constantinople Telephone Company has previously been noted in these columns, have also left London to take up their new duties in Constantinople.

Frank Bracelin, for some time district commercial manager of the Northwestern Telephone Company at Crookston, N. D., has taken charge of the Fargo branch of the company, succeeding T. H. Hillary, who has been appointed special agent for the states of Minnesota, North Dakota and South Dakota.

W. C. Handlan has resigned as general manager of the National Telephone Corporation, Wheeling, W. Va., and the receivers have appointed E. A. Howard, auditor of the company, as his successor. All pending litigation has been deferred in order to give the parties an opportunity to agree upon a compromise of their differences.

P. B. Cumings has been appointed manager of the Hamilton County Farmers' Telephone Association, Aurora, Nebr.

J. B. Wrabek, local plant chief of the Mountain State Telephone and Telegraph Company, Hamilton, Mont., has been appointed local manager for the company.

Fred Best, who recently resigned as manager of the Federal telephone exchanges at Fairport, East Rochester, Pittsford and Charlotte, N. Y., has been appointed by the company to a more important position as manager of the Seneca office.

NEW TELEPHONE COMPANIES.

Raisin City, Cal.—The Raisin City Rural Telephone Company has been organized with the following officers: President, J. R. Moore; vice-president, L. A. Pearson; secretary, J. M. Kuns; treasurer, J. B. Flickenger.

Sacramento, Cal.—Articles of incorporation have been filed for the Central California Telephone Herald Company with a capital stock of $1,000,000 for the purpose of operating central stations from which music, songs, recitals, lectures and sermons will be furnished subscribers.

Elgin, Ont., Can.—The South Crosby Rural Telephone Company, Limited, has been incorporated with a capital stock of $20,000. The provisional directors are Dr. D. A. Coon, J. S. Dargavel, and A. L. Campbell, all of Elgin.

Toronto, Ont., Can.—The Typo Telegraph Company, Limited, has been incorporated with a capital stock of $500,000 to manufacture and sell telegraph and telephone supplies and equipment.

Smyrna, Del.—The Smyrna and Western Telephone Company has been incorporated with a capital stock of $25,000 by W. H. Tunis, Joseph M. Hazel, Joseph M. George, Charles F. George, Thomas Donnelly, W. C. Myers, of Clayton; Joseph Jones, J. H. Lamb, T. F. Lamb and W. W. Blodgett, all of Townsend, and William Armstrong, of Smyrna.

Washburn, Ill.—Articles of incorporation have been filed for the Washburn Telephone Company by Oscar Shepard, C. E. Spangler and John Jaquot, capital stock, $2,000.

Addieville, Ill.—The Beaver Pond Telephone Company has been incorporated with a capital stock of $1,244 by William Bohbrink, Fred Becker and William Groennert.

Fort Wayne, Ind.—The Indiana Electric Appliance Company has been incorporated for the purpose of manufacturing electric appliances, electric fixtures, telephones, etc. The directors are Charles E. Prange, Arthur Lepper and William L. Moellering.

Seymour, Ind.—The Albering Telephone Company has been incorporated to construct and operate a telephone system in Jackson county. The directors of the company are Herman Albering, Henry Duwe and John Sunderman; capital stock, $5,000.

Algona, Ia.—The Algona Rural Telephone Company has been incorporated by F. A. Witham, Thomas Rich and A. S. Walker; capital stock, $1,000.

Armstrong, Ia.—J. T. Cheever, Roy B. Felkey and J. F. Houseman have incorporated the Northwestern Mutual Telephone Company with a capital stock of $3,000.

Moorhead, Ia.—The Oak Ridge Telephone Company has been incorporated by C. W. McCue, N. Swanson, Nels Carlson and others.

Clinton, Ia.—Articles of incorporation have been filed with the auditor of state by Edward Miller, E. A. Calusen and Henry Miller for the Miller Telephone Company.

Westphalia, Kans.—The Farm and Grange Telephone Company has been incorporated by J. F. Bierley and H. A. Brown, Westphalia; L. M. Reynolds and Jos. Selanders, of Colony, and H. G. Bloom, Mt. Ida; capital stock, $5,000.

Caldwell, Kans.—The North Fairview Rural Telephone Company has been incorporated by Floyd Parsons, G. B. Moore, F. L. Fisk, E. J. Springer and M. T. Fortmeyer; capital stock, $500.

Ashland, Ky.—Articles of incorporation have been filed for the Ashland Telephone Company, with a capital stock of $125,000, by W. B. Seaton, Chas. F. Weaver, Chas. Russell, John Russell and Harold Means.

Tollsburg, Ky.—The Louisa and Webbville Telephone Company has been organized by R. Collinsworth, John Hall and W. V. Roberts; capital stock, $1,000.

Frankfort, Ky.—Articles of incorporation have been filed by which the Cumberland Telephone and Telegraph Company absorbed the East Tennessee Telephone Company. The capital is $16,000.

Roanoke, La.—The Roanoke Farmers' Telephone Company has been incorporated with the following officers: President, J. M. Booze; vice-president, F. F. Clayton; secretary-treasurer, E. E. McMilan; capital stock, $7,000.

Boston, Mass.—The General Railway Equipment Company was recently incorporated in Maine with a capital stock of $15,000,000. It will take over the United States Electric Company, the National Telephone Selector Company, the Sandwich Electric Company, the Electric Switch and Signal Company, the Charter Electric Company, the Sandwich Pole Changer Company and the International Telegraphic Call Company, having a combined outstanding capital of $2,155,000. The new company's cap-

ital is divided into $5,000,000 7 per cent preferred cumulative after May 1, 1912, and $10,000,000 common stock, par being $100 in both cases. Of this $1,500,000 preferred and $4,500,000 common stock has been authorized for the purpose of providing a substantial working capital for organization and other expenses.

WENDELL, MINN.—Articles of incorporation have been filed for the Wendell Telephone Company, capital stock $10,000. The incorporators are S. S. Wangsness, Andrew Hawkenson, Elbow Lake; M. E. Bergerud, Fergus Falls; T. A. Boyd, M. L. Adams, H. T. Haavig, C. E. Prestrud, Erik R. Baasen and H. G. Lillemoen, Wendell.

MAPLETON, MINN.—The South Mapleton Telephone Company has been organized with Geo. M. Cooper as president and Frank Phelps, secretary.

BLACKDUCK, MINN.—A new telephone company has been organized in this place with the following officers: President, George Tenyke, of Quiring; vice-president, Charles Hayden; second vice-president, Bunn Wilson; treasurer, C. J. Carlson, Quiring; secretary, J. E. Dade.

FERRIS, MINN.—The Tri-State Telephone Company has been organized and the officers are as follows: President, G. L. Pierson, Guthrie; vice-president, T. E. Jondahl, Guthrie; secretary, N. J. Nelson, Farris; treasurer, J. P. Schmidt, Farris.

MORRISTOWN, MINN.—Articles of incorporation have been filed for the Morristown Telephone Company, with a capital stock of $10,000. The officers are: President, Geo. Bahr; vice-president, Wm. Liebrenz; secretary, L. F. Von Eschen; treasurer, L. A. Kiser.

FRAZEE, MINN.—The Frazee Telephone Company has been incorporated with the following officers: President, W. F. Just; vice-president, I. L. Swain; secretary and treasurer, E. F. Gummer; capital stock, $11,000.

TRES PIEDRAS, N. M.—Articles of incorporation have been filed with the state corporation commission by the Mica Corporation, an organization which proposes to do a general telephone, telegraph, water rights, lighting and real estate business under the charge of E. C. Osborn, statutory agent. The capital stock is $3,000 and the incorporators are E. C. Osborn, Tres Piedras; A. L. Osborn, and M. A. Calhoun, Denver.

NASSAU, N. Y.—A co-operative telephone company has been incorporated in this place with a capital stock of $3,000 by John L. Barue, Dr. J. B. Southworth, Joel L. Morey, Ralph M. Coper, Delmar Lynd, Oscar G. Winters, John Nelson, W. H. Delamarter, S. W. Utter, Frank Roshirt, Lester Clapper, Seward Clapper, W. A. Shadick, L. H. Knapp, Peter Bertram, James Lowerree. It is the purpose of the company to cover the territory formerly covered by the Columbia and Rensselaer Telephone Company. The new company was organized because of an increase in rates by the operating company. Construction work will be started at an early date.

JAVA, N. Y.—The Java Telephone Company has been incorporated and the directors are as follows: Edward J. Conroy, Lizzie M. Conroy, John R. Griffin, Jennie W. Griffin, Java Center; Lewis J. Hall and Mary Hall, Arcade; W. H. Gillette, Buffalo.

PULP, N. C.—Articles of incorporation have been filed for the Town Folk Telephone Company by Chas. Bodenheimer, E. Fulp, Barker Bros. and J. V. Marshall; capital stock, $5,000.

CHARLOTTE, N. C.—The Tulin Telephone Company has been organized with a capital stock of $10,000 by G. J. Gouger, C. T. Allison, W. D. Goodnight, D. P. Johnson and John Oehler.

DONNYBROOK, N. D.—Secretary of State Norton has issued articles of incorporation for the Renville Telephone Company with a capital stock of $48,000. The directors are C. J. DeVore, S. B. Oke, J. Steinbegea, A. E. Swanson and Amil Gludt.

BERTHOLD, N. D.—The Berthold Farmers' Telephone Company has been incorporated with a capital stock of $50,000 by William W. Wixer, G. A. Luke and John I. Porter, all of Berthold.

OSTRANDER, O.—C. J. Eckelberry and others have organized the Delaware Union Mutual Telephone Company.

KEOKUK FALLS, OKLA.—The Keokuk Falls Telephone Company has been incorporated with a capital stock of $3,000 by Fred Q. Frick, C. A. Frick and U. S. Frick.

GEIGER'S MILLS, PA.—The Robeson Rural Telephone Company has been incorporated with a capital stock of $5,000.

PAGES MILLS, S. C.—Articles of incorporation have been filed for the Hayes and Lester Telephone Company by W. E. Lester, Pages Mills and Charles P. Hayes, Kemper, president and vice-president, respectively. Miss Olive Hayes is secretary and treasurer of the company.

FORK, S. C.—The Fork Telephone Company has been incorporated by L. K. Bethea, W. W. Schofield and L. M. Rogers with a capital stock of $1,000.

HURRICANE, S. C.—J. E. Pearsons and J. M. Garrett have incorporated the Hurricane Telephone Company; capital stock, $500.

KIMBALL, S. D.—The Smith Telephone Company has been incorporated with a capital stock of $2,000 by Batty Ryan, R. C. Bickner, J. Hora and C. Raish.

ROSEFIELD, S. D.—Articles of incorporation have been filed for the Rosefield Telephone Company by Ben C. Graber, Jacob E. Graber, and J. P. Graber, of Marion; capital stock, $15,000.

BETHPAGE, TENN.—The Bethpage Home Telephone Company has been incorporated with a capital stock of $2,000 by G. W. Chipman, T. L. Moncrief, T. L. Moss, A. C. Earle and J. W. Morgan.

ALTO, TENN.—The Alto Telephone Company, capital stock $1,000, has been incorporated by S. S. Swann, A. Garner, Sr., J. H. Clark, T. J. Gipson and W. G. Ikard.

SHARON, TENN.—The Sharon Rural Telephone Company has been incorporated by Arden Somers, Arnold Roberts, O. R. Beard, H. B. Stephens, W. E. Adams, J. C. Stewart, F. F. Lawrence, W. N. Bullington and O. J. Walsh; capital stock $5,000.

SHELBYVILLE, TEX.—The Citizens' Rural Telephone Company has been incorporated by J. C. Crawford, Sam Smith, J. P. Windham and others; capital stock $2,116.

GEORGES CREEK, TEX.—Articles of incorporation have been filed for the Citizens' Telephone Company by T. A. Duncan, R. D. Ratcliff and W. T. Howth; capital stock, $2,400.

CHILHOWIE, VA.—Articles of incorporation have been filed for the Love Mill Telephone Company of which W. C. Parks is president and J. E. McSpadden, secretary; capital stock, $5,000.

OAK HILL, W. VA.—Articles of incorporation have been filed for the Oak Hill Telephone Company by Cal Mankin, George M. Jones and J. G. McLain, Oak Hill; J. W. Coleman, Mossey, and W. W. Ogden, Prosperity, W. Va.

MASONTOWN, W. VA.—The Masontown Telephone Company has been incorporated with a capital stock of $5,000 by W. H. Post, A. W. Hawley, George W. Rohr, S. L. Cobun and Earl Dixon.

SLATYFORK, W. VA.—The Marlinton and Elk Telephone Company has been incorporated by L. D. Sharp, Robert Gibson, John D. Gibson, Slatyfork; W. L. Gay and Levi Gay, Edrey.

WAYNE, W. VA.—Articles of incorporation have been filed for the Echo Telephone Company by L. F. Thompson, Theron Ball, Bol Holland and A. J. Edincott, of Genoa; John Jackson and Tolbert Smith, Sidney; A. Booth and Bonnie Booth, Wayne; capital stock $1,000.

WAITEVILLE, W. VA.—The Upper Pott's Valley Telephone Company has been incorporated by C. H. Doss, C. C. Patton, J. W. Williams, T. G. Crosier and B. P. Williams; capital stock, $520.

SHEBOYGAN, WIS.—Articles of incorporation have been filed for the Six Corners Telephone Company; capital stock, $2,000. The incorporators are Nicholas Thull, George Stirdevant and Edmund Bock.

GREENGROVE, WIS.—The Atwood Telephone Company has been incorporated with a capital stock of $600.

DAVID, KY.—The David Telephone Company has been incorporated with a capital stock of $2,000 by Hugh Riddle and others.

DILLON, MONT.—Articles of incorporation have been filed for the Centennial Telephone Company with a capital stock of $20,000. The directors are Robt. T. Boatman and B. B. Miller, Monida; Ernest O. Selway, Dillon.

FINANCIAL ITEMS.

ATWOOD, ILL.—The capital stock of the Atwood Telephone Company has been increased from $12,000 to $16,000.

JACKSONVILLE, ILL.—The Illinois Telephone Company recently declared its twenty-eighth semi-annual dividend of 3 per cent.

GALATIA, ILL.—The capital stock of the Galatia Telephone Company has been increased from $2,480 to $5,000.

BELVIDERE, ILL.—The Belvidere Telephone Company has issued $30,000 preferred stock which makes the capital stock of the company $80,000 and it has enabled it to consummate a deal whereby it has taken over the Bell Telephone Company's interests in this place, change effective June 1, when the Belvidere Company takes possession, assuming all responsibility. The purchase price was $20,000.

PORTLAND, IND.—The capital stock of the Co-operative Telephone Company has been increased from $15,000 to $20,000.

DABNEY, KY.—The Dabney Telephone Company has increased its capital stock from $2,000 to $4,000.

Sioux City, Ia.—Preparatory to the merger of the independent and Bell telephone systems in this city, the stockholders of the Sioux City Telephone Company, the independent concern, have voted to increase the capital stock from $750,000 to $1,250,000, preferred, and it is announced this issue will be used for enlarging the facilities and will be offered on the public market.

Lexington, Ky.—To secure a loan of $1,500,000 the Cumberland Telephone and Telegraph Company has filed in this city a first mortgage on all of its properties in Kentucky, Indiana, Tennessee, Mississippi and Louisiana, to the Columbia Trust Company, New York, and Frank W. Conn, Brooklyn. The loan is for a period of twenty-five years.

Bardstown, Ky.—The Woodland Mutual Telephone Company has increased its capital stock from $500 to $1,000.

Amherst, Nebr.—The Amherst Telephone Company has been given permission by the state railway commission to issue $5,200 bonds for the purpose of building a new office and making other improvements.

Rochester, N. Y.—The directors of the Rochester Telephone Company have authorized the redemption of $154,000 general mortgage bonds, and the company has deposited that amount with the Rochester Trust and Safe Deposit Company, trustee, for the purpose of purchasing and retiring as many as possible of its bonds.

Cleveland, O.—The North Electric Company has reduced its capital stock from $2,250,000 to $135,210.

Marysville, O.—The Union County Telephone Company has increased its capital stock from $50,000 to $125,000.

Columbus, O.—At a recent meeting of the stockholders and directors of the United States Telephone Company a quarterly dividend of 1½ per cent on $1,000,000 of the preferred stock was declared. The company annually pays 6 per cent in dividends. All the old officers were re-elected and are as follows: President, Frank A. Davis; vice-president, E. R. Sharp; secretary, W. L. Cary; treasurer, H. B. Taylor; general manager, G. R. Johnston.

Columbia, Pa.—The capital stock of the Columbia Telephone Company has been increased from $100,000 to $125,000.

Sawyer, Wis.—The Viking Telephone Company has doubled its capital stock, increasing it from $1,000 to $2,000.

Jackson, Ky.—For the purpose of constructing long distance lines the Breathitt County Telephone Company has increased its capital stock from $5,000 to $8,000.

Hindman, Ky.—The Hindman Telephone Company has increased its capital stock to $7,000 and will construct additional lines.

RATES.

Lincoln, Nebr.—The Lincoln Telephone and Telegraph Company, which recently purchased the interests of the Bell company in the South Platte country, has announced an increase of rates amounting to fifty per cent to each subscriber, which is being opposed and the Central Labor Union is taking the lead in the fight that will be made against it. The company also announces that the automatic telephones will be used.

Plymouth, Wis.—On application of the Plymouth Telephone exchange to the railroad commission permission has been granted the company to increase its rates from $1.75 to $2.00 on business telephones and from $1.10 to $1.25 on residence telephones, which will mean $1,000 additional earnings.

Visalia, Cal.—Several merchants of this city are up in arms over an attempt on the part of the local telephone company to raise rates, based on the claim that the public utility law which recently became effective compels the increase of rates in certain cases.

Caldwell, Idaho.—At a recent meeting the city council passed a resolution favoring municipal ownership of a telephone system. This resolution was in the nature of a protest against the raising of telephone rates. A meeting will be held on May 10th to consider the matter.

Mt. Vernon, Ia.—The Bell Telephone Company has announced a 25 per cent increase in rates, and a large number of subscribers have pledged themselves to discontinue the service rather than pay the increase. Capital sufficient for a local company has been forthcoming, should the situation demand it.

FRANCHISES ASKED AND GRANTED.

Albion, Wash.—The town council has granted a franchise to the Inland Co-operative Telephone Company.

Palouse, Wash.—The Pacific States Telephone and Telegraph Company has been granted a ten-year franchise in this city with the provision that the company pay $85 a year and provide free telephone service at the city hall.

Rome, N. Y.—The Bell Telephone Company has been granted a franchise to place its wires underground. The work will start at once and must be completed by November 30 or the company will forfeit $25 for each day until the work is completed.

Terrill, Tex.—The Southwestern Telephone and Telegraph Company has been granted a franchise in this city.

Washington, Ind.—The Pike County Telephone Company has been granted a franchise in this place.

Davenport, Ia.—The Tri-City Automatic Home Telephone Company has secured a franchise in this city.

Cumberland, Md.—The Chesapeake and Potomac Telephone Company has made application for a permit under its charter and franchise to lay conduits under the streets of Cumberland to connect with its proposed new exchange building so as to have an underground instead of an overhead wire service.

Crosby, Minn.—The city council has granted the Aitken-Deerwood Telephone Company a franchise to install a telephone system.

Windsor, Ont.—The Bell Telephone Company has been granted a five-year, exclusive franchise in this city for which the company pays $1,500 and furnishes a number of free telephones for the city.

Jacksonville, Fla.—The Home Telephone Company recently organized in this city has applied to the city council for a franchise to install a local independent telephone system.

Moline, Ill.—The Tri-City Home Automatic Telephone Company, recently organized, is seeking a franchise in this city, and to this end has filed with the Moline city clerk a petition signed by 2,300 asking that an election be held regarding the matter.

Texarkana, Ark.—The Mackey Telephone and Telegraph Company's application for a franchise in this city has been refused by the city council, the aldermen believing the franchise was too liberal.

Williams, Ariz.—The Overland Telephone Company has been granted a franchise in this place.

Ottawa, Ont., Can.—The city of Ottawa decided to renew the five-year exclusive franchise that the Bell Telephone Company has with this city on condition that the company would agree to pay the city $12,000 a year for five years, instead of $5,000 a year, and the offer was accepted by the company. Rates will remain the same, $45 for business and $25 for residence telephones.

Conyers, Ga.—The Conyers Telephone Company, recently organized in this place in opposition to the Southern Bell, has been granted a franchise here. Because of increase in rates by the Bell, nearly all its subscribers have discontinued the service.

Rossville, Ill.—The Rossville Telephone Company has been granted permission to maintain its lines on any highways in the north half of the county for a period of fifty years.

Rockford, Ill.—The Northwestern Telephone and Telegraph Company has been granted permission to run its lines through Boone County. The company will run four lines between Rockford and Chicago.

Rock Island, Ill.—A petition is being circulated by the Tri-City Automatic Telephone Company among Rock Island citizens asking a right to establish a telephone plant in this city.

Washington, Ind.—A franchise to build an independent telephone system in the county has been asked of the local council by the Pike County Telephone Company. The Central *Union* recently purchased the independent company in this city.

Donora, Pa.—The Independent Telephone Construction Company of California, Pa., has been granted a perpetual franchise by the city council.

Monongahela, Pa.—The Independent Telephone Company has been granted a franchise in this city.

Dupree, S. D.—The South Dakota Independent Telephone Company has been granted a twenty-five-year franchise in this place and will install an exchange at once.

Higgins, Tex.—The Arnet Telephone Company, Arnet, Okla., has been granted a franchise in this place by the city council.

Centralia, Wash.—The Street Urban Telephone Company has been granted a twenty-five-year franchise by the county commissoners to operate in Lewis county. J. T. Lowry is president of the company and John Christison secretary.

Tacoma, Wash.—The city council recently revoked the franchise of the Home Telephone Company of Puget Sound, and within sixty days all poles and wires belonging to the company must be removed from the city's streets. The property

was purchased by another company in November last for $550,000.

MISCELLANEOUS.

SAVANNA, ILL.—The directors of the Independent Telephone Company have elected the following officers: President, Frank Zinnel; vice-president, A. P. Woodruff; secretary and treasurer, L. S. Bowen.

MT. AUBURN, ILL.—The local telephone system has been purchased by D. A. Merris.

PRINCETON, ILL.—Elmer Sapp, for the last two years president and general manager of the Bureau County Independent Telephone Company, has retired from these two offices and has been succeeded by Aaron Dunbar as president and S. S. Harris as general manager while Dr. M. H. Blackburn is vice-president and C. V. Field, treasurer. Mr. Harris is also secretary of the company. He has been connected with the company for the last ten years and his promotion comes as a reward for faithful and efficient service. The company has declared the regular semi-annual dividend of four per cent. In retiring from the management of the company Mr. Sapp leaves it in the most prosperous condition it has ever enjoyed. It is one of the leading independent telephone systems in the state and thoroughly covers Bureau county with its network of wires. The annual report shows there are over 5,300 telephones in use in the county, 1,530 of them being on the Princeton exchange.

LA PORTE CITY, IA.—Otto Wettstein, Jr., of this city, one of the largest owners of independent telephone exchanges in the state, recently made a deal in which he closes out all his telephone interests in this state and Nebraska for land in central Florida. The deal includes his interest in the Public Utility Company of this city and involves a consideration of over $400,000. Mr. Wettstein comes into possession of 42,000 acres of farming land in Florida which will be disposed of in small farms and to the sale of which he will give his entire attention.

WARSAW, IND.—The Commercial Telephone Company is planning for extensive improvements in its system during the summer, which will mean an expenditure of $7,000 to $8,000, and when completed the equipment will be equal to any of the telephone companies in the state.

MADISON, IND.—The controlling interest in the Madison Telephone Company has been sold by Edward E. Powell to local capitalists for $35,000. The principal purchasers are John W. Tevis, C. H. Powell, S. J. Bear and Louis Sulzer.

ELKHART, IND.—The Home Telephone Company contemplates the expenditure of approximately $100,000 in the improvement of its system during the year. W. L. Shoots is manager of the company.

WAVERLY, KANS.—L. C. McCandless, of Princeton, has purchased the Coffey County Telephone Company's system in this place for a consideration of $14,000.

BRONSON, MICH.—St. Joseph and Branch counties will soon have one telephone system as the Southern Michigan Telephone Company has purchased the Three Rivers system and will merge the two lines, to be operated under the management of the Himebaugh or Southern Michigan Company. The consideration was approximately $75,000. The Southern Michigan company is capitalized at $1,000,000.

DULUTH, MINN.—The Zenith Telephone Company has made an appropriation of $178,000 for new construction and improvements to its system to be carried on during the present season.

SKIDMORE, MO.—At a meeting of the stockholders of the Farmers' Mutual Telephone Company and the Nodaway Valley Telephone Company, held in this place, it was decided to consolidate the two companies.

WEEDSPORT, N. Y.—The New York Telephone Company has purchased all of the property and business of the Cayuga, Onondaga Telephone Company in this place for a consideration of $16,500.

RENSSELAER, N. Y.—The Public Service Commission, Second District, has received notice that the West Shore Home Telephone Company and the Rensselaer Home Telephone Company have been merged with the Albany Home Telephone Company.

MAYVILLE, N. D.—The North Dakota Independent Telephone Company has sold its lines to the Red River Valley Telephone Company for a consideration of $900.

GALION, O.—The Telephone Improvement Company will locate in this city. Galion citizens were asked to subscribe to $100,000 in stock in order to bring the plant here, but in three days a total of $135,000 was subscribed through the efforts of members of the Commercial Club, and in addition $7,700 was donated for a site.

COLUMBUS, O.—The Adams County Telephone Company has asked the Public Utilities Commission for permission to purchase the exchanges of the Central Union Telephone Company at West Union and Seaman for $3,064, and the Central Union Company has asked to buy the Winchester Exchange of the Adams County Telephone Company for $2,350.

KIRKWOOD, PA.—At the annual meeting of the Southern Telephone and Telegraph Company, held in this place, the following directors were elected: Mahlon B. Kent, Christiana; William D. Swisher, Atgien; Charles P. Swisher and Cyrus G. Barr, Kirkwood; Frank M. Greenleaf, Fairmount; James Wood, Kirks Mills; W. P. Bolton, Liberty Square.

CANOVA, S. D.—The Canova Telephone Exchange has been purchased by Glenn S. Buchanan.

WACO, TEX.—Ben C. Hyde of Kansas City, who recently purchased a controlling interest in the Brazos Telegraph and Telephone Company in this city for $175,000, announces the purchase of the independent exchanges at Ft. Worth and Waxahachie, and several long-distance lines will be constructed to north Texas at once. It is aimed by the reorganized company here to take over all the larger independent exchanges of Texas and establish a first-class long distance service all over the state. The local company owns twelve exchanges and several long distance lines.

WHEELING, W. VA.—An important telephone deal affecting the independent companies operating in this district was consummated recently, when the receivers of the National Telephone Company turned over to J. G. Splane of Pittsburg, as agent for the Pittsburg and Allegheny Company, of which he is general manager, the properties of the National Telephone Company in Pennsylvania. The exchanges included in the transaction are those of West Alexander, Claysville, Taylorstown, West Middletown, Washington and a few others. They have heretofore been under the control of the National of West Virginia. It is stated the transfer will prove mutually advantageous to both companies, as well as to the subscribers.

GOLDENDALE, WASH.—At the annual meeting of the stockholders of the Goldendale Telephone and Telegraph Company the following officers were elected: President, W. J. White; secretary-treasurer, Frederick Wilson; directors, W. T. Darch, Ralph Fenton, E. R. Morgan, C. F. Kayser and W. J. White.

LITTLE ROCK, ARK.—E. S. Bloom, second vice-president of the Southwestern Bell Telephone system, announces that his company contemplates the expenditure of $5,000,000 in Arkansas in the next three years. Preparations are being made to handle nearly 2,000 more subscribers in the local exchanges within the next year.

LITTLE ROCK, ARK.—A certificate stating that the location of the Southern Telephone and Telegraph Company has been changed from Little Rock to Arkansas City has been filed with the secretary of state.

SAN FRANCISCO, CAL.—The Sunset Telephone and Telegraph Company have filed papers with the county clerk, stating that their place of business is 303 Shreve Building, San Francisco, instead of Martinez.

SAN FRANCISCO, CAL.—The Municipal Telephone and Anti-Merger League, of which O. L. Scott is president, has filed with the board of supervisors a petition requesting that steps be taken at once to have the city acquire by construction, or by purchase of the Home Company's plant, an automatic telephone system, and that a proposition for a bond issue to cover the cost be submitted to the people.

INDIANOLA, FLA.—The Titusville Telephone Company, the Indian River Telephone Company, the Tropical Telephone Company, and the Brevard County Telephone Company have been consolidated under the name of the Brevard County Telephone Company, with main office in this place. The officers are as follows: President, George F. Paddison; vice-president, H. S. Williams; secretary and treasurer, J. E. Reed.

SAVANNA, ILL.—At the annual meeting of the Savanna Mutual Telephone Company the following officers were elected: President, W. P. Rhodes; vice-president, Thomas Taylor; secretary, C. C. Thill; treasurer, L. H. Maloney; directors, Charles Keyport, John Wagner, C. S. Ferguson, J. B. Williamson, William Gillogly, C. J. Wurster, J. W. Miller and J. D. Lyness.

TAYLORVILLE, ILL.—The Christian County Telephone Company has elected the following officers for the coming year: President, Warren Penwell, Pana; vice-president, L. D. Hewitt, Taylorville; secretary, J. S. Eaton, Owaneco; treasurer, C. M. Parker, Taylorville.

ROCK ISLAND, ILL.—By an overwhelming vote the people of Rock Island declared against the sale of the plant and equipment of the Union Electric Telephone Company to the Central Union Company.

Hardy, Ark.—The Hardy Telephone Company has been purchased by R. M. Gay.

Champaign, Ill.—The following companies have been merged under the name of the Pesotum Telephone Company, which has been incorporated with a capital stock of $2,200: Sadorus Private Telephone Company, Pesotum Telephone Company, Cooper Telephone Company, Kyle Telephone Company, Empire Telephone Company, Union Telephone Company, Nelson Telephone Company and Crittenden Telephone Company.

La Porte, Ind.—The La Porte Independent Telephone Company is preparing to install an up-to-date modern telephone exchange and will also erect a new exchange building for the same, at an estimated cost of $30,000.

South Bend, Ind.—The Central Union Telephone Company contemplates the expenditure of $80,000 in improving its system in this city during the year. Provision will be made for 1,200 additional telephones.

Uniontown, Ind.—The Farmers' Union Telephone Company has elected the following directors: E. E. Foster, William Sage, Oscar Lewis, Jacob M. Foster, Wilford Sage, Pressley M. Morrison and Frank Davis.

Rockport, Ind.—The Park County Telephone Company plans extensions and improvements to the amount of $25,000 during the present season.

Marion, Ia.—The Marion Farmers' Mutual Telephone Company has re-elected its old officers as follows: President, I. D. Robinson; secretary, R. N. Fitzgerald; treasurer, Floyd Sargent.

Osage, Ia.—The Eureka Telephone Company elected officers as follows: President, Robert Eckford, Jr.; vice-president, H. L. Wilson; secretary, K. J. Johnson; treasurer, J. H. Johnson.

Topeka, Kan.—The Topeka Independent Telephone Company has sold its property to the Missouri and Kansas Telephone Company, and the Public Utilities Company has granted permission to merge the two plants, which will be done as quickly as possible. The deal includes the local exchange, the rural lines and the stock in the long-distance lines.

Larned, Kan.—The Arkansas Valley Telephone Company, an organization of telephone companies from Hutchinson to Dodge City, has announced that it will spend $10,000 in improving the Larned plant during the spring and summer.

Fall River, Mass.—At the annual meeting of the Fall River Automatic Telephone Company the following officers were elected: Treasurer and clerk, Bradford D. Davol; assistant treasurer and manager, Clark Chase; directors, Edward B. Jennings, Edmund W. Wakelee, John T. Swift, Danforth H. Hathaway, Joseph Waters, Martin Feeney and Bradford D. Davol.

Alma, Mich.—At the annual meeting of the Union Telephone Company the following officers were elected: President, C. T. Babcock; vice-president, E. S. Wagar; treasurer, G. S. Aldrich; secretary, L. L. Conn; general manager, W. J. Melcher. Reports showed a large increase in business during the past year.

Cadillac, Mich.—The Michigan State Telephone Company is planning for extensions and improvements to its system in this city, which will mean an expenditure of about $50,000.

Holland, Mich.—The Citizens' Telephone Company announces that it will spend about $7,000 in improving its service in this city.

Adrian, Mich.—The Lenawee County Telephone Company contemplates the expenditure of $75,000 in improving and extending its system.

Biloxi, Miss.—The Cumberland Telephone and Telegraph Company contemplates installing a central energy system in this city.

St. Louis, Mo.—The Bell telephone companies in Missouri, Kansas, Oklahoma, Arkansas and Texas have opened headquarters in the Bank of Commerce building, St. Louis. Herman J. Pettengill, president of the Southwestern company, has been elected president of the group, and will move from Dallas to St. Louis; E. D. Nims, first vice-president; E. S. Bloom, second vice-president.

Seward, Neb.—The Seward County Independent Telephone Company has closed a deal with the Lincoln Telephone and Telegraph Company, whereby the latter company takes over the lines of the former, paying therefor $100,000.

Penn Yan, N. Y.—At the annual meeting of the Yates County Telephone and Telegraph Company the following directors were elected: Charles E. Guile, Frank M. McNiff, Frank E. Spencer, C. B. Briggs, T. W. Windnagle, Thomas N. Davis, Samuel I. Thayer, James G. Alexander. David Miller, president; Charles E. Guile vice-president; Thomas N. Davis, secretary, Herbert C. Ovenshire; treasurer, Frank E. Spencer.

Pittsburg, Pa.—The Pittsburg and Allegheny Telephone Company was recently reorganized by the election of Dr. John L. Dickey of Wheeling, W. Va., as president; J. G. Splane, Pittsburg, as vice-president, and an entire new directorate. Steps were taken to dissolve the receivership and to acquire the independent telephone plant in this city.

Pittsburgh, Pa.—It is announced that the Central District and Printing Telegraph Company has appropriated about $80,000 for the improvement of its plant in this city.

Knoxville, Tenn.—The East Tennessee Telephone Company announces that it will place its wires underground in the business district.

Dallas, Tex.—With a view to facilitating the detail work of the Southwestern Telephone and Telegraph Company, changes have been announced in the management of the general offices in Dallas and St. Louis. C. A. Gates has been appointed general manager, with headquarters in Dallas. E. D. Nims, of St. Louis, treasurer of the Bell system of Missouri and Kansas and of the Pioneer Telephone Company of Oklahoma, becomes vice-president of those systems and treasurer of the Southwestern. Edgar S. Bloom has been promoted to the position of second vice-president of the Southwestern, his headquarters remaining at St. Louis. J. P. Crowley, of Dallas, has been appointed secretary of the Southwestern company, with headquarters at Dallas. J. E. Farnsworth, of Dallas, formerly vice-president and general manager of the company, remains as first vice-president, but has been relieved of the detail duties of general manager by the change.

Ozona, Tex.—The Bennet telephone system operating in this place, has been purchased by the Rio Grande Telephone Company of Alpine, the consideration being $50,000.

Amarilla, Tex.—A deal was recently consummated whereby the Southwestern Telephone and Telegraph Company takes over the property of the Panhandle Telephone and Telegraph Company for the consideration of $175,000. The purhcase was made from A. L. Waterbury of Chicago and his associates, who but recently acquired the ownership. Many improvements will be made in the system.

Bryan, Tex.—The Bryan Telephone Company is preparing to spend about $30,000 in improving its plant. A complete new central energy system will be installed.

Tazewell, Va.—The Bluefield Telephone Company is preparing to expend quite a large sum in improving its lines in this county.

Ladysmith, Wis.—The Chippewa Valley Telephone Company will practically rebuild its system in this city.

Hillsboro, Md.—The Farmers' and Merchants' Telephone Company will erect a new exchange building.

Ysabel, Sonora, Mex.—The Sonora (Mexico) Land and Timber Company will install an extensive telephone system on its ranch near this city and will also build long distance lines to different towns in this section. J. T. T. Paxton is general manager of the company.

Kansas City, Mo.—The Home Telephone Company, also the Kansas City Long Distance Telephone Company, have been taken over by the Telephone Securities Company, a West Virginia corporation incorporated by Theodore Gary and H. L. Gary of Macon, Mo., and A. F. Adams of Joplin, Mo. The officers are: President, Theodore Gary; vice-president, A. F. Adams; secretary and treasurer, H. L. Gary. The officers are all well-known independent telephone men who have been active in the telephone business for many years, and their purpose in acquiring these properties is to increase their present telephone holdings. It is the intention to extend and enlarge the present service.

Lincoln, Neb.—The Lincoln Telephone and Telegraph Company has purchased the following companies: Plattsmouth Telephone Company, Howard County Telephone Company, Grand Island Telephone Company, Nebraska City Telephone Company, Golden Rod Telephone Company.

Cleveland, O.—The supreme court has just affirmed a decision of the circuit court of Van Wert county which is of great significance to the United States Telephone Company. The decision sustains all the contentions of the United States company regarding the validity of exclusive contracts with local operating companies. Every contract made between the Bell company and an operating company with which the United States company has an exclusive contract is declared void and the local operating company is liable to an action compelling an account of any business sent over the Bell company's lines within the area of service of the former company. This decision has been eagerly awaited, as there has been considerable loss of service by reason of these prohibited contracts in the past few years.